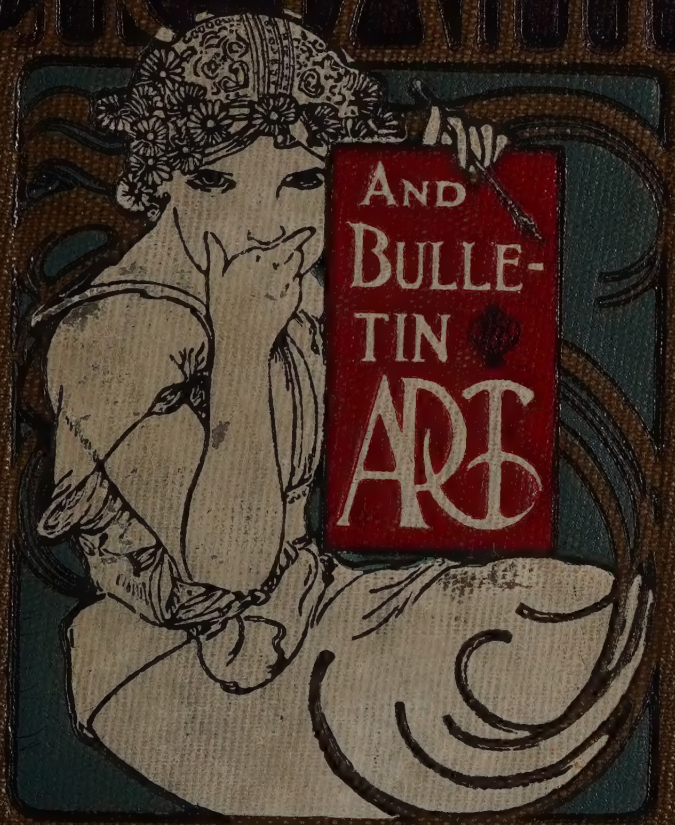
Atton's

SIGN PAINTING



ANDERSON COLLEGE
LIBRARY

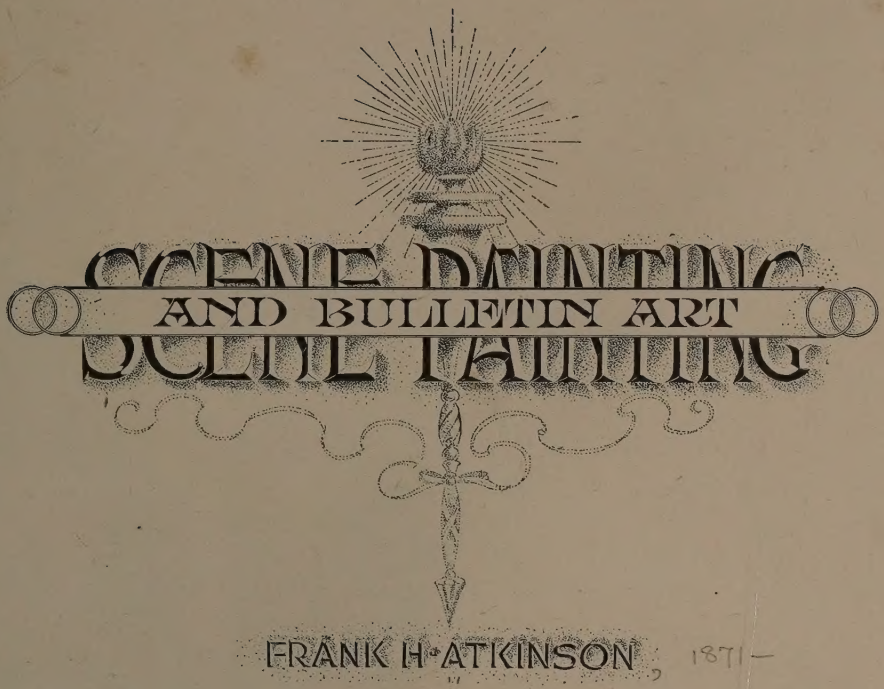
ND 2885 .A8 1916 35494
Atkinson, Frank H.
Scene painting and
bulltetin art

ANDERSON COLLEGE
LIBRARY
ANDERSON, INDIANA

ANDERSON UNIVERSITY
ND2885 .A8 1916 #35494!
Atkinson / Scene painting and bulletin art
3 2197 00053 9219

WITHDRAWN

A.O.D OFFORT



FRANK H. ATKINSON, 1871–

CHICAGO
FREDERICK J. DRAKE & CO.
Publishers

Copyright, 1916
BY
FREDERICK J. DRAKE & CO.

ANDERSON COLLEGE
LIBRARY
ANDERSON, INDIANA

2885
.A8
1916

PREFACE

IN presenting this book, Atkinson wishes to make it clear that he has been prompted by the same motives and desires as heretofore, namely, to provide the ambitious with a reliable textbook which will be within the reach of everyone.

Those employed in Scenic Studios and Bulletin Studios will find the book a real inspiration to greater effort, and their knowledge and ability will increase in exact proportion to the time devoted to serious study and application which from the outset are urgently recommended. The "genius" in Art, to which allusion is so often made by laymen, is just another word for hard study and work on the part of those to whom the term is applied, and it can be conservatively stated that this distinction is within the reach of anyone endowed with energy and determination.

Among the different processes herein contained and indicated there will be found some that the best artists would not disdain to adopt. In all arts, if persons who had given themselves to research and hard study, had communicated to their fellows the particular modes of operation which had succeeded with them, the arts would have been the gainers. It is assumed that talent exists among all persons of average intelligence and is but another term that can be interpreted as ambition in the individual who sets out to acquire a professional knowledge of the art of painting. All that is said and demonstrated in this book must be taken as purely auxiliary means, and will not confer great ability unless taken as a means to facilitate the labor and study of the conscientious student.

The book is subdivided into three divisions, comprising, 1, Educational Division; 2, Scene Painting Division; and, 3, Bulletin Art Division. While much in the educational section might seem superfluous and in a measure irrelevant to either of the subjects, it is deemed most vital. In fact, it is so important and essential that a disregard of it will leave the student but poorly equipped to undertake either scenic work or bulletin pictorial.

Ignorance of well-grounded art principles and knowledge pertaining thereto will positively handicap the student in any line of artistic endeavor (individual opinions to the contrary notwithstanding), and scenic work and bulletin or display advertising art are no exception; and bear in mind that both fields are serious branches of art, and the artists engaged are conspicuously

ANDERSON COLLEGE
LIBRARY
35494

well informed on the "academics" of art, and rank high as clever artists.

After passing to the Scenic Division it is assumed that proficiency in drawing has been acquired, as without it there is small hope for any real progress. Then, again, the thorough, well-trained artist in another line of artistic endeavor would and could fail utterly in theatrical scene painting if found lacking in experience in the practical phases and methods involved in this very important and agreeable art, to say nothing of the comparative mammoth size of the compositions encountered in theatrical scenery, and last but not least the handling and technique of distemper colors in large masses and planes.

The facility of hand and eye necessary either to draw or write is given to most of us, but after we have learned to write or draw (as we all may), all of us cannot use these means of expression alike. Artistic perception must be considered and it is the factor which causes its possessor to select, arrange, emphasize and color natural facts, and can be called talent, genius, or just plain ability.

One is no more born with the ability to draw than he is with the ability to write the letters of the alphabet. It is acquired by study and practice. Neither can a drawing of any artistic value be produced without a knowledge of form, color, perspective and composition; in short, a good art education. The part of art that is inborn is the instinct or "feeling" for dramatic effect, color, and various other qualities summed up in the term "artistic perception." Therefore the scope of a work such as this is limited to teaching the professional and mechanical part of the work. Many excellent artists are extremely poor teachers because they overteach instead of giving the acknowledged principles of art as a working basis, and because they insist upon more or less minute modes of procedure original with them. Such a course is destructive.

Atkinson is indebted to an enormous fund of reference from which he has borrowed freely and which he trusts will be appreciated from a contemporaneous standpoint, valuable because authentic, and practically covering the principles and methods which are concurred in by all artists who are taking their art seriously.

Special credit must be given to Professor William R. Ware, author of "Modern Perspective," and to The Macmillan Company, publishers, who have most courteously permitted us to quote from this excellent work.

In closing these remarks he cannot refrain from quoting a famous artist, thus:

"Imagine not that the profession of a painter is that of an idler; on the contrary, it is of all occupations the one perhaps that requires most activity; for one is constantly engaged if not with the art itself, at least with the materials. All true artists will tell you that if the art of painting were not in itself replete with charms (as in fact it is for all who practice it with love), it would be a very painful pursuit; so many precautions must be taken, so many things to be nicely calculated, foreseen and prepared, independently of the considerable time which must be consecrated to it for the art itself, if one would make progress.

The way, though difficult, arduous and perplexing more than you can yet conceive, has been trodden without fear by multitudes, and with great success by not a few; there is no reason, then, that, with zeal and constancy, the same heights can be attained still, and the guides provided for the perilous and toilsome way are of the best that could be had, long experienced in the route, faithful in their undertaken duties and animated with a heartfelt interest in the success of the adventurous traveler whose steps they have professed to lead.

All that is needed is perseverance; if this does not exist, better give up the attempt at once, for, be assured, that without it there can be no real genius. To be disheartened by art's difficulties, or to weary of its toil, is a positive proof that the desire for success therein is a mere temporary emotion, the child of vanity and caprice, such as is born to thousands, and not the legitimate offspring of genius or serious desire for painting.

To be numbered with these thousands is not difficult, and in this volume will be found more than is needful for weak aspirants. What the great Winkelmann says of the fine arts in general may be applied to their practice in every particular instance; that is to say (as they have had their childhood and pubescence in which only the bombastic and wonderful gave pleasure), so, through all time, the commencement of "art" in each individual displays (with very rare exceptions) the wish to excite admiration by means which more experience and a taste more highly cultivated will teach him to reject.

If (as that judicious, though enthusiastic, scholar conjectures) the earliest painters of immortal Greece designed not otherwise than as her first embryo poets composed, so, in all time, the first paintings of every artist will be but as the first attempts of every embryo poet, displaying power and taste, perhaps, in their immaturity, but poorly regulated and all under the evil spell of a dominant vanity.

Further, in all human performances, the violent and impetuous, the volatile and superficial go before; they are the unweighed

action and glittering but unsubstantial product of ill-regulated talent, pleased with its own exertion, excited by the anticipation of its longed-for triumph, and dazzled at the crude splendor and florid unsubstantiality of its own success; slowly after them, but eventually to take the lead and long keep it, march the grave and solid, the steady and self-collected and sedate; the long-meditated, but perhaps rapidly executed achievements of well-grounded principles whose base is nature and whose structure and analysis bespeak the sober observation and comparison of known results."

With these remarks (and Atkinson hopes you will read them again) he invites you to a serious contemplation of the work, and assures you it stands as ready to impart knowledge to you as you are to receive it, and with this thought ever uppermost, he respectfully and enthusiastically dedicates the book to the crafts mentioned, and which have acted as a title for the book.

CONTENTS

PART I—EDUCATIONAL SECTION

		PAGE
I.	Values	11
II.	Colors	13
	Color List	16
III.	Implements and Sundry Materials	22
IV.	Oils and Varnishes	24
V.	Manipulation	25
VI.	Landscape Painting	27
VII.	General Hints on Color	30
VIII.	Painting Heads	35
IX.	The First Painting	43
X.	The Second Palette	51
XI.	The Second Painting for the Head	56
XII.	Drapery	60
XIII.	Explanatory Glossary	62
XIV.	Drawing from Nature	67
XV.	Perspective—Section 1	72
XVI.	Perspective—Section 2	77
XVII.	Perspective—Section 3	86
XVIII.	Perspective—Section 4	99
XIX.	Perspective—Section 5	106

PART II—SCENE PAINTING

I.	The Studio	145
II.	General Equipment	147
III.	The Bridge	150
IV.	The Palette and Brushes	151
V.	Preparing the Canvas	155
VI.	The Model or Sketch and the Sketch Room	158
VII.	Scale Drawing	159
VIII.	Mixing Colors, Laying-in, and Painting	162
IX.	General Hints on Scenic Colors	165
X.	Architectural Painting	170
XI.	Stage Perspective	175
XII.	Interiors	181
XIII.	Drawing and Arrangement of Set Scenes	184
XIV.	Transformation and Fairy Scenes	191
XV.	Transparencies	194
XVI.	Pounces, Stencils, Etc.	196
XVII.	Possibilities of Scene Painting	200

PART III—BULLETIN ART

		PAGE
I.	Outdoor Painted Display Advertising	207
II.	Designing	210
III.	The Modern Poster and Display	218
IV.	Reference Material	220
V.	In the Bulletin Studio	221
VI.	Painting the Pictorial	223
VII.	Procedure in Painting	228
VIII.	Color Combinations	230
IX.	Wall Advertising	233
X.	Mural Painting	235
XI.	A Few Final Tips	236
XII.	Recapitulation	237

SCENE PAINTING AND BULLETIN ART

PART I—EDUCATIONAL SECTION

I

VALUES

Of supreme importance in painting is the true understanding of *values*. Color is, at all times, comparative, and values cannot be determined in any way but by comparison.

If we take white and add a pinch of black, we produce a pale gray, which, compared with the white, is a *value*. Add to this value a pinch of black as before, which will produce a trifle lower tint, and we have what is termed a *second* value. This value, with a pinch of black added, will produce a trifle deeper gray; and we can proceed thus until we reach deep, or low, gray and, lastly, black itself. Now, if we lay the values thus produced in small planes close together, with their edges touching, we can lightly soften these edges with a dry badger blender without interfering with the individual purity of each value, and thus produce an agreeable gradation of values, ranging from white to black.

With these values set upon a palette, we could render a drawing in black and white which would be suitable for reproduction in magazine or book illustration and whose proper name would be a *monotone*.

Now, for a monotone having more refinement and in which the values are more pleasing, take about equal parts of the primary colors, red, yellow and blue, which will produce a very low, or deep, gray. Proceeding as before, we shall produce an infinitely more agreeable series of values in monotone, subtle, with a feeling of color in them, although no color is discernible,—therefore *neutral* in quality; and the series may be termed *primary neutrals*. These will form the basis of all color calculations and make it absolutely possible to control *tone* and *key*.

Now, if we take the list of primary neutrals and number them consecutively from the highest to the lowest value, we shall have tone and key under absolute control.

For example, we will take an average open landscape for subject; mood of the day, bright sunshine. To establish key, take a generous quantity of No. 4 value of the primary neutral list (see chapter II) and add a mere trifle of strontian yellow to

"warm" it, being careful not to get it too yellow. This will now be our tone value and will answer for all of the high values in the key, such as sky grays and purple grays in distance and middle distance. Care must be taken to diminish the quantity of tone used as we approach the foreground.

For shadows in foreground, take low primary neutrals composed of brown ochre, burnt sienna, and ultramarine blue, and after making absolutely neutral, that is, devoid of color, cool it by adding more blue. This will give us the low transparent value known as "juice," which must enter into all shadows, bearing in mind that it must be used discriminately, plus local color to be found in the shadows.

We are to bear in mind that adding color to tone or "juice" judiciously, or as dictated by the study or subject, does not materially raise or lower the value indicated.

By this process it is positively possible to produce a painting very pleasing and agreeable as to tone, atmosphere and color quality. The process is the same regardless of subject, whether landscape, marine, figure, or figure group, still life of all kinds, in any lighting, natural or artificial, exterior or interior setting. And we must bear in mind at all times the imperative rule from which there is no deviation, namely, all objects close to view, such as foregrounds of landscapes, figures close up, etc., must be rendered in full color, adding tone as the distance increases, and eliminating all detail. In middle distances and extreme distances, we simply record the color value of the plane with a faint or slight suggestion of shadow. If we introduce too much tone in "close-up" color values, our painting will be too gray.

The choosing of tonal value and its manipulation, the introduction of color necessary to produce true color values for the rendering of pictorial planes and modeling in light and shade, can only be acquired by constant study and practice; and while it has taken only a little space to describe the method, it will be found upon conscientious trial to embrace the all-important factors of the art of painting.

It must be remembered that the same discrimination must be observed relative to *key,* as it is positively necessary to key with the aid of a neutral tonal value governed by the mood, condition and pose of the subject; and all with due respect to the light and its arrangement, and whether natural or artificial. Thus, human figure posed in bright sunlight would dictate a high key. In this instance the local flesh tint would act as the tonal value and should compare in value with No. 4 or No. 5 in the Primary Neutral list. We will not use any of the neutrals, however, in the preparation of this local flesh tint, but will produce it with white as a base, tinted with Venetian red, golden ochre and burnt sienna, taking of each but a trifle; and thus the value can be reached, making it the same value, with a difference only of color quality.

This plan can be carried out with reference to all tints and hues. They will compare in value with a value found in the gradations of the Primary Neutral list, and also compare in value at times one with the other. For instance, black is the lowest value, very deep blue is practically the same value, and so on up the whole chromatic scale. Experiments in mixing and comparisons will make this all very clear.

Now, if we pose the same human figure under lamp light or in the glow of an open grate fire, we must key the setting or surroundings in low or dark values, with the figure and light keyed in an orange tone. This will create the feeling of light and warmth and force the feature or central note into its due prominence and bring out the great difference between the low values of the general surroundings and the values necessary to produce the bright note in the composition.

II

COLORS

For the purpose of further experiment, and to gain greater familiarity with color, select ten different tones in natural objects, —such as the red tone of the tomato, the green of an apple, etc.,— and try to match them with different combinations of the highest primary colors, namely, light cadmium, alizarin crimson, ultramarine blue. By eliminating from your palette the ochres, umbers, madders, and other variations of these three simplest colors, the problem of matching natural tones is greatly simplified. If a tone is not yellow enough, you have only to add more of the yellow. If the tint is not cold enough in quality or value, add a trifle more of the ultramarine. If you would have it warmer in color and value, add some red or yellow, or both, and so on.

An extensive series of experiments with any group of primaries from high to low will agreeably surprise you. After you have practiced sufficiently to become quite well acquainted with the possibilities of color, try to paint some flowers. Pose real roses and in looking at them do not think of them as pink, or yellow, or whatever local color they may happen to be. Try to see all the different tones they contain. If you look at them rightly, with an artist's eye, you can see pinks, yellows, greens, purplish pinks, and all sorts of beautiful mixed tones. Do not merely render the flowers a pure pink because your literal sense of sight tells you they are literally pink in color. Try to look at them as if you had never seen a pink flower and did not know

that there is such a color as pink. Look at them as if you were observing color for the first time.

In a certain light a pink rose might show a distinctly purple tone in the dark shadows. There might be no trace of pink, or, if there is, it would show but a slight trace. These things should be carefully observed and faithfully recorded. The main study in attempting to paint these flowers should be to get the color. You need merely to get the suggestion of form in this instance, without paying serious heed to the drawing.

When a sunbeam is passed through a prism of flint glass, and the image, or prismatic spectrum, is received upon a screen of white paper, it is found to consist of numerous rays of different colors which are conveniently divided into six groups, namely, red, orange, yellow, green, blue and violet. The limits of each color are not strongly defined in this spectrum, for they run into or blend with each other, forming various hues. Thus, there is a space where the red appears pure red, whence it gradually runs into orange, by first mixing with the extreme portion and afterward with increasing portions of the yellow rays. Then we arrive at a space of pure yellow. Further on, this yellow becomes greenish, by blending with the extreme blue rays, which go on increasing until we arrive at pure green, which becomes bluer and bluer, until we arrive at pure blue. Beyond the blue we again approach red, by which are produced various hues of violet, termed lavender, purple, or indigo, according as the blue or the red predominates.

Of these six colors, three are termed *primaries,* because they are the source whence all other colors are derived by mixture. Thus, blue mixed with yellow produces green; mixed with red, it yields violet; and red mixed with yellow produces orange. These mixtures of the primaries in pairs are termed *secondaries.*

The following table exhibits the primaries and the secondaries with their hues, resulting from mixtures of the primaries in various proportions, but in pairs:

(A.) Primary Colors.

Red	Yellow	Blue	
4	0	0	= Red
0	4	0	= Yellow
0	0	4	= Blue

(B.) Secondary Colors, composed of equal parts.

2	2	0	= Orange
0	2	2	= Green
2	0	2	= Violet

(C.) Tertiary colors.

3	0	1=Violet red
3	1	0=Red orange
1	3	0=Orange yellow
0	3	1=Yellow green
0	1	3=Greenish blue
1	0	3=Blue violet

(D.) Compounds of the three primary colors yield Grays.

1	1	1=Neutral gray

(E.) Suppose the color to be normal Red; then:

By adding to the normal Red—

1. Blue, we produce violet and its hues.
2. Yellow, we produce orange and its hues.
3. White, various pinks.
4. Black, various tones of dark red.
5. Gray, various broken tones—red, grays or browns.
6. Green, will yield a gray.

By adding to the normal Blue—

1. Red, we produce violet and its hues.
2. Yellow, we produce green and its hues.
3. White, various tints of blue.
4. Black, various dark tones of blue.
5. Gray, various broken tones—blue grays.
6. Orange, orange gray.

Normal gray is black mixed with white in various proportions, producing numerous tones of pure gray.

Neutral grays result from the mixture of all three primaries in various proportions, producing "colored grays," as previously stated in the chapter on Values.

COLORS IN USE BY MODERN ARTISTS

The list of colors on following pages is quite complete, and from it can be chosen a palette for any purpose, from the most abbreviated to the most extensive. While the list is very extensive, it is so given that you may easily become familiar with it. It is only through thorough acquaintance with practically all of the colors popular with professional artists that you will eventually be able to choose and simplify your palettes for every-day use.

Upon close observation, it will be found that many of the colors in each group are virtually of the same color and value, and it is only necessary to segregate the colors so related into serial groups. Thus you will be enabled quickly to determine a practical abbreviated setting, keeping in mind that it only requires a high and low primary from each group to give you a very simple and practical palette for any ordinary subject. As you attain

skill in manipulation and increase your color knowledge, you will be better able to appreciate the truth of this statement. If you were to set the palette with the multitude of colors given in this list, you would have nothing but confusion.

In the list as given, you will find auxiliary to it the individual qualifications of each color, and whether it is a slow or consistent drier. This is practically all that it is necessary to know about each individual color so far as it concerns the professional manipulation of it. It is not necessary to go into a chemical analysis further than to determine the effect any certain color having a specific name will have upon a neighboring color when applied to the canvas.

The most essential thing to know about a color is whether it is fugitive or permanent, poisonous or non-poisonous.

A fugitive color is one that fades or diminishes from the hue recorded at the time of painting, after exposure to light, either in a long or short duration of time. Fugitive color should be avoided if the work is desired for permanent exhibition, but it can be used indiscriminately if the work is of a temporary nature, or for reproduction.

A permanent color is a color that retains the hue recorded at the time of painting. Among the permanent colors are a number that intensify or deepen in value and quality. This is due, not so much to their chemical composition as to the action of the oil used in the reduction, which has a tendency to deepen.

A poisonous color is a color that materially changes itself, after a short lapse of time attacks neighboring colors and alters them. When this action takes place it is termed "poison" in artists' vernacular, and the result is a "false note" in the "poisoned area."

Non-poisonous colors are colors which work agreeably in all admixtures with other colors, with true affinity.

COLOR LIST

RED GROUP

1. *Cappah Brown:* transparent, rich and deep in color; dries well, permanent.

2. *Vandyke Brown:* (bituminous earth) a rich, transparent pigment; permanent; slow drier.

3. *Burnt Umber:* a quiet brown, affording clear, warm shadow hues; not as deep in value or as rich in quality as Vandyke brown; inclined to be fugitive; dries well.

4. *Venetian Red:* a very fine brownish red of powerful tone; one of the best colors and indispensable; dries fairly well.

5. *Burnt Sienna:* a rich, transparent brown, affording a wide range of valuable landscape tints of rich greens, in combination

with blues, and of sunny tones when used with white; permanent; dries well.

6. *Light Red:* simply yellow ochre calcined; a trifle higher in value than Venetian red and resembles it closely; fine for dull reds in drapery, carnations and landscape; fine for local flesh tints in male complexions; permanent; dries well.

7. *Indian Red:* resembles both light red and Venetian red, and can be classed in the same family or series; a trifle purplish in quality; permanent; dries well.

8. *Scarlet Lake:* a rich transparent color of little value; very fugitive and has but little power; should be repudiated.

9. *Alizarin Crimson:* a beautiful rich red, transparent, and with many artists a prime favorite, although it does not approach the genuine madders for quality of color and strength; permanent; dries slowly.

10. *Brown Madder:* one of the madder family; affords the richest of shadows and the most delicate pale tints. With ultramarine or cobalt and white, a series of fine warm or cold grays will result; with blues and bright yellows it gives fine autumnal russet greens.

11. *Vermilion, Pale:* same qualities as deep vermilion.

12. *Vermilion, Deep:* when pure, is permanent and cannot be replaced with any other analogous red; dries slowly. Many artists prefer vermilion in the dry state because it grinds up easily on the palette and permits of the muriatic acid test to ascertain adulteration, which, if present, will manifest itself by the rapid fading of the pigment when the acid is applied.

13. *Carmine:* a very rich, transparent deep red; preference should be given madder carmine, which is permanent and reliable. Cochineal carmine is inclined to be fugitive.

14. *Madder Lake:* ranges from pink to the deepest rose color, under the names of pink madder, rose madder, madder lake, and madder carmine. They are the only permanent transparent reds known. Rose madder is mostly used, and is very rich and transparent.

15. *Mars Orange:* an artificial iron ochre, clearer in tone than burnt sienna, but more opaque; affords bright warm tints with white, but does not answer for greens; permanent; dries fairly.

16. *Mars Red:* another iron ochre of great beauty and solidity; permanent; fair drier.

17. *Pink Madder:* excellent; permanent; dries slowly.

18. *Rose Madder:* most popular of the madder group, permanent; dries slowly.

19. *Scarlet Madder:* deep and very rich; permanent; dries slowly.

20. *Burnt Carmine:* charred cochineal carmine; a fine color for vigorous shadows; permanent dries slowly.

ANDERSON COLLEGE
LIBRARY
35494

21. *Madder Carmine:* the carmine par excellence; very rich and permanent; slow drier.

22. *Field's Orange Vermilion:* a glowing orange which, with white, yields pure and delicate carnation tints, and produces beautiful sky tints.

23. *Crimson Madder:* another of the madder group; bright; permanent; dries slowly.

24. *Brown Madder:* a rich, transparent brown; fine for vigorous shadows, glazing, and admixture; permanent; slow drier.

YELLOW GROUP

25. *Naples Yellow:* affords light, clear, sunny tints when combined with white; warm in tone; permanent; dries well. It should not be used in flesh tints, being too cool, but it may be in reflexes on the shadow side of flesh. It is a fine color for broad lights on foliage and metals, flower painting, and yellow drapery. Avoid grinding it with a steel palette knife—use a horn or ivory palette knife. It is semi-poisonous; will attack some colors and not others.

26. *Yellow Ochre:* "King of the palette"; good everywhere that one may choose to use it; it is indispensable in "carnations" or flesh tints; absolutely non-poisonous; can be mixed with any color on the palette; quite opaque; permanent; dries fairly.

27. *Brown Ochre:* this color replaces the preceding in all mixtures of values that require to be of a more vigorous tone than could be produced by No. 26. It is not, however, to be used for "bright notes," whether of flesh or any other object which is to remain brilliant. It has a tendency to intensify, especially when mixed with white; for general low tones and "juice" it is good; semi-opaque; with Prussian blue it produces useful warm greens, and with black and burnt Roman ochre, gives tones that are excellent for portrait backgrounds, landscape grounds, and furniture. Alone, it is rich and mellow, and in admixture produces sober, rich tones in extensive use.

28. *Indian Yellow:* a bright, transparent color, approaching gamboge in quality; used only for glazing or for admixture with the ochres or with Naples yellow to heighten and enliven their color. Never use it in flesh or skies. It is fine for glazing over yellow ochre or Naples yellow; the value and quality thus obtained will be of great beauty.

29. *Roman Ochre:* a bright golden ochre that serves for strong, vivid, semi-transparent greens, and affords bright, sunny tints when combined with white.

30. *Burnt Roman Ochre:* very vigorous and must be employed discreetly; intensifies in oil and is quite energetic; must be kept out of "bright notes." Reserve it for accents in shadows where it can be mixed with crimson madder, roman ochre, ultramarine and blue black. It is fine for dusky red or brown drapery and even

in the shadows of bright red drapery, adding to it vermilion, and sometimes madder lake, according to circumstances. Permanent; slow drier.

31. *Raw Sienna:* fine in landscape painting; semi-transparent; permanent; slow drier.

32. *Yellow Lake:* a bright, transparent, vegetable yellow; fugitive; slow drier; produces good foliage tints.

33. *Italian Pink:* a stronger and richer kind of yellow lake, possessing similar properties.

34. *Aureolin:* a superb yellow possessing a rare combination of invaluable qualities—purity, brilliancy, transparency, and permanence. It ranks in importance with genuine ultramarine. Mixes well with all other colors, forming with blues an extensive range of greens of unrivaled brilliancy. Delicately pure and aerial grays, suitable for atmosphere, are produced from a combination of aureolin with cobalt, rose madder, and white. By substituting ultramarine for the cobalt, the tints are still clearer and more delicate. Reds and browns with aureolin yield a most exquisite range of tones. It is of importance to note that, by the side of genuine ultramarine and rose madder, aureolin completes a triad of brilliant primary colors.

35. *Chrome Yellow—Light, Medium, and Deep:* either is very brilliant, works admirably, and covers well, being very opaque; poisonous to the last degree; will positively change alone, and affects with change all colors it is united with. It may be used with safety as local color in bright yellow drapery, and for high lights on gold ornament; must be applied pure, with all underlying color perfectly dry, and is then safe. There is hardly any combination of color that it will not "poison" when intermixed, in which case it is bound to produce a false note. For bright yellows, yellow ochre should be preferred, using it as a lay-in in a first painting; when dry, it can be glazed with Indian yellow or aureolin.

37. *Lemon Yellow:* a beautiful, light, vivid color; in body and opacity nearly equal to Naples yellow, but much purer and more lucid in color and tint, and at the same time not liable to change by damp, sulphurous, or impure air, or by the action of light, or by the steel palette knife, or by mixture with white lead, zinc, or other pigments; this makes it a valuable addition to the palette. It is principally adapted to high lights and produces agreeable effects when glazed over greens.

38. *Aurora Yellow:* an opaque and brilliant variety of sulphide of cadmium. It vies with genuine ultramarine in its combination of exquisite beauty and unflinching durability; much denser than the ordinary cadmiums, and a good drier in oil; permanent.

39. *Cadmium Yellow, pale:* semi-transparent variety of sulphide of cadmium; brilliant and permanent; dries slowly.

40. *Cadmium Yellow, medium:* same as the *pale.*

41. *Cadmium Yellow, deep:* ditto. The cadmiums are rich and beautiful in tone and supplant all other yellows in brilliancy; non-poisonous; permanent.

42. *Cadmium Orange:* ditto.

43. *Gamboge:* similar to yellow lake and Italian pink; fugitive; slow drier.

44. *Raw Umber:* a yellowish-brown native earth, affording clear light shadows and delicate grays; permanent; easy drier.

45. *Mars Yellow:* another iron ochre, brilliant, opaque, permanent, non-poisonous; dries well.

46. *Strontian Yellow:* a brilliant color very popular with many artists, but inclined to be a trifle fugitive and changeable. Primrose aureolin is much to be preferred, which is similar in color, permanent, and non-poisonous.

BLUE GROUP

47. *Antwerp Blue:* a modification of Prussian blue, with less strength and permanence; non-poisonous.

48. *Prussian Blue:* a deep and powerful transparent blue; dries well and glazes well; chiefly used in admixtures of greens, purples, etc.; permanent; non-poisonous.

49. *French Ultramarine:* extremely powerful and semi-transparent; the accepted substitute for the more expensive genuine ultramarine; indispensable, permanent, non-poisonous, fair drier.

50. *Cobalt Blue:* a pure light azure, affording clear bright tints in skies and distances. With light red it gives beautiful cloud tints; with madder brown, a range of fine, pearly neutrals. Dries well; non-poisonous; quite opaque.

51. *Mineral Blue:* a modification of Prussian blue; inclined to be fugitive after long exposure to light, and intensifies when deprived of it.

52. *Chrome Green—Light:* same as deep chrome green.

53. *Chrome Green—Medium:* same as deep chrome green.

54. *Chrome Green—Deep:* very poisonous and not in favor.

55. *Emerald Green:* a brilliant green; occasionally of value, if discreetly used, in the drapery of a foreground figure, the vivid greens to be noted in Venetian scenes, etc.; fine for delicate, pale-green sky tints when used in combination with cobalt green or emeraude green. The pale green tints alluded to are particularly noticeable on the western horizon in gorgeous winter sunsets in temperate latitudes.

56. *Verdigris:* a brilliant, transparent, rich green lake; fugitive; suitable for glazing; not in great favor.

57. *Green Oxide of Chromium:* a fine color; rich in tone, inclined to olive; very strong, having great tinting power; employed with great effect by admixture with yellows and white; permanent; non-poisonous; slow drier.

58. *Green Oxide of Chromium, Transparent:* same as No. 57 in every particular except that it is transparent and employed in glazing; slow drier.

59. *Cobalt Green:* a beautiful, rich, bluish green, fine for tints and admixtures; permanent; non-poisonous; slow drier.

60. *Emeraude Green:* a fine, deep green, rich in tone; termed by many artists the green of greatest utility; slow drier.

61. *Green Lake:* a transparent lake having an olive quality; suitable for glazing shadows of green drapery, water reflections in landscape, etc.; slow drier.

PURPLE GROUP

62. *Mauve Lake:* a beautiful, rich, transparent lake; fine for vivid purple effects, such as drapery, and in the production of violaceous grays; very fugitive, and should never be employed except on work where durability is of no consequence; slow drier.

63. *Purple Lake:* similar to mauve, but not quite as fugitive; slow drier.

64. *Cobalt Violet:* A beautiful new purple; produces splendid violaceous grays with white; permanent, and of great general utility; slow drier.

65. *Purple Madder:* the "king of purples," and, like all of the madder series, can be relied upon; permanent; very rich in quality, and of great utility; slow drier.

66. *Mars Violet:* ranks second to purple madder in richness and color quality; permanent, and of general utility; slow drier.

NEUTRAL GROUP

67. *Bitumen* is asphaltum ground in strong drying oil; produces brown glazes for shadows, etc.; dries well.

68. *Blue Black:* a fine, semi-transparent, bluish black; not as strong as ivory black, and therefore better suited for the grays and general mixed tints of a landscape; slow drier.

69. *Brown Pink:* very fugitive, and not greatly favored; slow drier.

70. *Cologne Earth:* resembles Vandyke brown, except that in combination with white it supplies a range of cooler brown tints; permanent; slow drier.

71. *Cork Black:* Produces soft grays when combined with white; slow drier.

72. *Ivory Black:* the richest and most transparent of the blacks; slow drier.

73. *Payne's Gray:* a blue neutral much in favor for the production of cool, neutral grays, when combined with white; slow drier.

74. *Cassel Earth:* analogous with Vandyke brown; slow drier.

III

IMPLEMENTS AND SUNDRY MATERIALS

The japanned tin box is much in favor with professional artists. It is 10 by 14 inches, and 3½ inches deep, with four 4-oz. tin oil bottles, covered tray for tubes, double bottom, open end, and three slides for wet sketches. It will comfortably hold a complete outfit of colors, oils, and brushes, palette, mahlstick, etc.

Fill the box with an assortment of tube colors from the foregoing list, limiting the number selected to about 40 or 45 colors. In making the selection, avoid the fugitive colors, as well as the colors which are too closely analogous.

For brushes, start the list by selecting one dozen Devoe's "English" artist's bristle, assorted round and flat. Then you can add the following brushes and sundries:

One dozen "Bright's" artist's bristle, assorted, Nos. 1 to 6.

Devoe's Special artist's bristle, one of each, style A to K, inclusive.

One of each, Artist's Red Sable, Nos. 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20.

Artist's Russian Sable "Bright's," one of each, Nos. 1, 4, 6, 9.

Artist's Extra Fine Ox Hair, one of each, both round and flat, Nos. 2, 6, 16 and 20.

"Boston" bristle, one of each, Nos. 1 to 12.

"Super" bristle, one of each, ¾ in., 1 in., 1¼ in.

Chiseled edge "Super," ½ in., ⅞ in., 1½ in., one of each.

One pair Improved palette cups.

One large "Studio" palette, two oblong palettes, 9 by 13 in.

One jointed mahlstick, 35 inches long.

One Tourist's "A" folding sketching easel.

One sketching-stool, half-cane form.

One sketching umbrella, gray linen; one umbrella staff.

One-piece horn palette knife, 6 inches long.

One trowel form palette knife, 4-inch blade.

One 6-inch porte-crayon.

One box Conte's Ordinary charcoal.

One dozen canvas pins—used to separate wet oil sketches.

One pair canvas pliers.

SUNDRIES AND IMPLEMENTS AND THEIR USES

The *Palette Cup* clamps to the outer edge of palette, and it is well to have two or three of them in use at the same time—one for oil, one for gold size or drying oil, and one for plain turpentine. Before using a palette, it should be given several coats of

boiled linseed oil, applied with a rag, allowing a day between applications; or a few coats of shellac can be given, which can be applied quickly, allowing an hour or so between coats. Apply the shellac very thin or trouble will result; a shellac-filled palette is just as good as an oil-filled, and consumes less time in the filling.

The *Palette Knife* is the implement with which the colors are manipulated on the palette. It is used to mix tints and tones and arrange them, and should be thin-bladed and flexible, tapering toward the end.

The *Easel* is a frame which supports the painting during its progress. The most convenient is the rack easel, which allows the artist to raise or lower his work with speed and convenience, as occasion requires.

The *Mahlstick* is used to rest or guide the right hand or arm when particular steadiness is required in the execution of small objects and minute details. It should be light and yet firm. The lower end of the stick is held in the left hand, while the upper end, which is covered with a soft round ball or pad of cotton, held to place with a little piece of chamois skin, rests on the canvas or against the easel.

Badger Blenders are brushes that can be had in various sizes, made so that the hair diverges or spreads after the manner of a dusting brush. They are used to soften or "sweeten" broad tints, such as skies, water, distances, and the like. They should be kept free from color, and when they become clogged or loaded, pinch together and wipe on a clean rag. A blender must be kept clean and as free from color as possible, otherwise it will cause trouble. It is well to add, while on the subject of blending, that most, if not all, professionals taboo the badger blender. The one important objection is that the blender destroys technic, and secondly, if its use be carried beyond a certain point, it destroys purity of color values. As one acquires skill in the manipulation of color, it will be found easy to soften edges of planes and values with the brushes in hand, it being only necessary to rinse the brush and stroke it a few times on a clean rag.

Rinsing Cup or Brush Washer.—Most artists prefer a larger rinsing pot than those listed in art material catalogs. A larger one is easily made by taking a common lard pail and suspending a fine-mesh strainer inside of it, so that it can be easily removed for the purpose of cleaning the pot.

Canvas is the universal material used for painting. It can be procured in various widths by the roll, or mounted upon stretchers any size desired. However, it is more economical to prepare your own canvas. Simply provide yourself with a box of Shattuck keys and some beveled stretcher strips, a small miter box and a few yards of Pequot ¾ unbleached muslin. You can then make up a stretcher in a few minutes. Straining the muslin will take only a few minutes more—and it is ready for business.

Give the mounted muslin a coat of glue size hot, and let it dry. Then give the canvas a prime of flat cream color for ground.

Academy Boards.—You can make these yourself by taking any old heavy pieces of Bristol board and giving them a coat of thin shellac to stop suction; when dry follow with a priming of cream color flat, quickly stippling it with a bat of cotton wadded in cheesecloth. This will give it "tooth" and produce an agreeable surface to work on. Use Academy boards for outdoor sketching from Nature and preliminary sketches in the studio.

IV

OILS AND VARNISHES

Vehicle.—The fluid used to temper and thin colors for the purpose of bringing them to the proper working state.

Vehicles are extremely diversified, to suit the various purposes of the artist.

Oils.—Linseed and poppy oils are the fixed oils used as vehicles. Turpentine, benzine, and gasoline are known as "thinners."

Linseed Oil is most commonly used and in high favor with all artists. It should be absolutely pure and for most durable results should be used *raw*—refined raw linseed oil—with a few drops of best grade Pale Japan Gold Size added to the palette cup, when the cup is two-thirds full of oil. Used in this way, it will wear better than poppy oil, and will keep its color just as well as poppy oil.

Poppy Oil is inferior in strength, tenacity, and drying qualities to linseed oil. However, it has a known affinity for nearly all tube colors, as they, with few exceptions, are ground in poppy oil. It is also necessary to add that the oils used are more or less influenced in their drying by the colors with which they are combined; some of which greatly accelerate, while others retard it. With some colors, the oil used will scarcely dry at all, unless special means are employed to cause them to do so. This calls for the discriminating use of Dryers or Drying Oil, or a good quality of Japan Gold Size, which will force slow-drying colors to dry within a reasonable time.

Note.—In the commercial branches of art, and most especially *bulletin art,* the second and third painting are entirely dispensed with, and the composition is rendered complete and in full color. This is accomplished by a lavish use of Japan Gold Size and the free use of benzine or gasoline. Oil is used sparingly, and only in sufficient quantity to keep color in a free working

condition. The use of benzine or gasoline greatly accelerates the setting of the colors, or sufficiently to enable the artist to overlay "scumbling" and "dragging." In commercial art, permanence and durability are not a necessary qualification, especially in art work for reproduction; while in bulletin art, a term of six months is all that is required as the maximum life of a bulletin pictorial.

The volatile oils are devoid of the strength of the fixed oils, having no cementing power at all. Turpentine has been mistaken as a dryer by many unfamiliar with its true qualification and tendency. It stimulates and accelerates drying by evaporation. The same is true of benzine and gasoline in a greater degree, as they are more volatile, evaporating very quickly; gasoline more so than benzine, and benzine more so than turpentine.

Hence, it is almost unnecessary to say that the tenacity and durability of the oil is lessened, which does not materially matter in commercial art, as previously stated. In serious high art, the use of the volatile oils is almost totally dispensed with, and megilp, copal or mastic varnish, linseed or poppy oil and turpentine, equal parts, will produce an agreeable vehicle for general use. Owing to the extreme fluidity of the volatile oils mentioned, the beginner is inclined to use them too freely, thinning the color beyond control.

Megilps possess a gelatinous texture, which enables them, while flowing freely, to keep their place in painting and glazing.

Mastic Varnish is indispensable in oil painting, being employed both as a varnish and as a component of many of the vehicles in common use.

Copal Varnish is a rather quick drying varnish and not in general favor with the profession; it has a tendency to crack and check if not assisted with a varnish having greater elasticity.

V

MANIPULATION

In the production of a painting there are certain methods of operation that require a full explanation. These are distinguished by the technical names of *glazing, impasting, scumbling,* and *handling.*

Glazing is the term used when a thin, transparent film of color is laid upon another color, to modify its tone or to aid the effect of the color. The process of glazing is effected by diluting the chosen transparent color or colors with megilp, gold size, or mastic varnish. Thus diluted, these colors are laid upon the under color or colors, which must be dry, or at least set sufficiently to

admit the laying of the glaze without "rubbing up." The object of glazing is to strengthen shadows, and to give warmth or coldness to their hue; to subdue lights which might be otherwise unduly obtrusive, or to give additional color and tone to those that are deficient in force and richness; or to produce particular effects, such as representations of dust, mist, smoke, etc. Many modern artists, however, dispense with glazing almost entirely, making use of it only in a very minor capacity.

Impasting, or *Impasto,* is the process of laying in color heavily, with either brush or palette knife; keeping the color "stiff," using little or no vehicle whatever. For example, in landscape painting the masses and planes affected by light are rendered *impasto;* while the shadows are rendered thin, with a feeling of transparency.

Scumbling is the negative of glazing, and is produced by light, dragging strokes of opaque color in a scantily-charged brush, or what is termed by artists a semi-dry brush. The handling should be loose and free, yet skilfully managed. As in glazing, the under color must be dry. Scumbling is used to modify certain effects by rendering the mass or plane to which it is applied cooler, grayer, and less defined than it was before; and to give a feeling of air and distance to objects that appear too near.

Handling is the term applied to the mechanical use of the brush or pencil, as exhibiting the artist's ability to adapt certain processes in the expression and representation of the different textures of objects, such as foliage, wood, water, figures, etc.

Breadth is one of the great principles of art, and without it no picture can be agreeable to the eye. It is the one great factor to aim for and strive for until it is attained. By breadth is meant a treatment that suppresses or generalizes unimportant details (read it again) which, if made too conspicuous, would enfeeble the proposed effect of the work. Thus, it is not the omission of detail that in any wise promotes breadth, but the proper method of dealing with minute detail.

A picture painted with truth and freedom does not tire the eye with its detail, but presents an effective and harmonized whole, unbroken by the crude "spottiness" of detail to which too much importance may be given; yet there may appear in it the most minute characteristic of any small object, without disturbing the breadth of the work.

The *finish* of a picture implies a treatment which gives proper attention to all details of the composition, whether in light or shade. But it is positively essential that this finish should not disturb the breadth. Every object must keep its place, but preeminence must be allowed the principal features of the picture.

Under no circumstances fall into the habit of "petty handling"; rather err on the side of too much breadth, which can be modified as proficiency and skill are acquired.

GRADATIONS, LIGHTS AND DARKS

The principal light in the picture, whether bright or subdued, should always maintain its precedence in tone and size—and necessarily all other lights are subordinated. The shape and size of the principal lights may be varied, but the inferior gradations must never be allowed to interfere with the principal ones. Pictures in which the dominant form is light, are more grateful to the senses than those in which the principal form is dark.

As the disposition of the lights and darks in a picture constitute so much of its value, too much attention cannot be given to this part of the study. It is from the shadows that the lights acquire their brilliancy. The light passages are those in which the full force of color prevails, whereas the best characteristic of shadow is repose, which must not be disturbed by violent contrasts.

SUNLIGHT

Sunlight must be rendered by tints slightly prismatic, composed of red, yellow and blue, that obviate coldness and realize aerial effects. A judicious use of the three primary colors will produce harmony, regardless of the subject treated; thus from the following tints may be produced the brightest sunlight, with gradations to the lowest color values in the scale:

1. Naples yellow or cadmium, vermilion and cobalt, for the higher lights.
2. Raw sienna or brown ochre; vermilion, madder lake and French blue or ultramarine.
3. Light red or Indian red, brown ochre, and Prussian blue with ultramarine.
4. Raw umber, madder brown, and Prussian blue with a little burnt sienna.
5. Burnt sienna, madder brown, and ivory black.
6. Burnt umber, madder purple, and black.

VI

LANDSCAPE PAINTING

There is no exact system upon which a landscape should be painted, for results equally good arise from various methods of procedure. There are, however, certain rules which must be observed in a greater or less degree; and in detailing these rules a method is selected, which is not only easiest for the beginner, but is practiced by some of the best landscape painters of the present day.

For a beginning, select a canvas of moderate size, 14 inches by 20 inches being a popular size, as being not too large and not so small as to tempt one to essay "petty handling." Until proficiency and confidence are acquired, it is not advisable to attempt large canvases; they might become embarrassing in the finishing.

Cover the canvas with a cream color tint for a ground and have it flat; that is, "break" white lead in clear turpentine and thin it to a working consistency with turpentine; this will produce flat color, or color having no gloss.

When dry, roughly block in the drawing with charcoal, and retrace in a more or less serious manner, using an HB lead pencil; then proceed to render the entire composition in water color in a more or less abbreviated manner. By mixing a little ox-gall or soap in the water used, it will eliminate "creeping" of the colors; in other words, they will adhere and stay as placed.

Tint the foreground with a mixture of yellow ochre and Venetian red, or with a pale wash of burnt sienna in water color. Omit the sky section, and commence at the horizon and work forward, strengthening the wash as you progress.

Allow this to dry, and proceed to sketch in accurately, with washes of burnt umber or Vandyke brown in water color, all objects of the design, finishing figures and foreground details quite seriously.

This will give you a preliminary painting in monotone, which will, when covered with semi-opaque grays and the rest of your "key," give a richness to foreground and middle distances not obtainable in any other way. This method is employed by many artists of the present time. The sketch being thus laid in, the systematic painting of the picture may be commenced.

The different phases of the work in progress will be designated as a first, a second, and a third painting. The first painting embraces the early or dead coloring; the second comprehends the general strengthening of values and the absolute record of the key and mood of the day; the third painting embraces the finishing of all details encountered in the composition. In landscape painting, the third painting is usually dispensed with, however, for the reason that most landscapes can be executed in two paintings or "sittings."

THE FIRST PAINTING

Again referring to the chapter on Values and key, you may proceed as therein suggested. You may prepare the tints and tone on a glass slab or on the palette; this preliminary grinding should give you a set of tints for the sky and distances in the key.

Begin with the sky and work downward, with a proper gradation of color and values; then follow the distances from the horizon down or forward, using the same tints and tone, strengthened by a trifle lower gray tints, which you will lessen as you reach

the foreground, where you will begin to introduce local and purer color.

Apply the color chiefly by short touches or pats of the brush, in succession, from left to right, beginning at the left hand upper angle of the canvas, and laying the color in a uniform film, or *impasto,* in the lights, and thinner and more transparent in the shadows. The color should be tempered with a proper quantity of vehicle, forcing it to work crisply.

For laying color scantily or thinly, use a short-haired brush; and for impasting use a long-haired brush, as it will hold and carry color more readily.

In the first painting it is well to render both light and shadow in scanty color, reserving the *impasto* for the second painting. Introduce all of the values in a firm and clear manner; be positive of the color and value before applying it. It is well to have a brush for every broad mass, plane, or value, and to place every color at once, as nearly as possible, where it is to remain, without unduly "teasing" it or "coaxing" it, for the reason that otherwise it will result in a muddy, turbid jumble of color, with little meaning.

THE SECOND PAINTING

When the first painting is dry, rub the canvas with a clean rag scantily saturated with linseed or poppy oil, which will cause the color of your second painting to unite with the first. Wipe the canvas with a dry, lintless rag, to remove superfluous oil, and proceed with the second painting, now giving more attention to the characteristics of the various objects. Their drawing, light and shade, reflected hues, and varieties of tint in coloring may be more elaborately rendered, the relative distances of objects from the eye being most carefully preserved.

Bear in mind that shadows must be thin and transparent, carefully united with half tints, where necessary, to produce roundness or solidity. Impast the lights with close attention to character and sharpness, and, lastly, introduce the high lights with skill and precision.

THE THIRD PAINTING

The third or finishing painting is commenced by wiping and oiling the canvas as in the second painting. Then proceed to complete the details of form and color which were brought out in the previous painting.

Introduce crisp touches of glazing and scumbling alternately; not to conceal, but to improve and render as perfect as possible what has already been done. Crisp, vigorous touches are to be given where the details require them, and where there may be either too great a softness or an obvious want of character and

transparency. These touches must be made with freedom and great decision, or they will fail in producing the desired effect.

In this stage of the work, do not attempt too much at one sitting, as, by proceeding too far, the tints laid by scumbling and glazing interfere with each other.

Lastly, a mode of aiding the finish is the passing of light, delicate tones over masses and planes that can be enhanced by so doing. This operation must be executed carefully and dexterously, with a light touch, holding the brush loosely, permitting the somewhat heavy color with which the brush is charged to adhere partially to the projecting color and to the natural roughness and texture of the canvas. This last treatment is called "dragging," or "dry touching." It must not be carried to excess or it will cause "chalkiness" or "mealiness"; and the canvas will appear as though sprinkled with chalk or dry meal, which will dull and gray the entire painting.

VII

GENERAL HINTS ON COLOR

In the preparation of sky tints, it will be observed that they are graduated in intensity by a greater or less quantity of *tone,* as suggested in the chapter on values, key and tone; and in laying them in, we place the strongest of them at the highest part of the sky, making them paler or higher in value and less intense as we descend toward the horizon, where the use of blue is discontinued and other tints are used, suitable to the character of the composition and the mood of the day.

The sky palette should be very simple; the colors few, with as many gradations of these colors as possible. Render the sky at once, and endeavor to render it complete in one sitting, if possible; or, at the most, leave but little for the second painting.

COLORS FOR SKIES

The following is a good general list of colors for skies: French ultramarine, vermilion, Indian red, madder lake, aureolin, yellow ochre, Naples yellow, and raw umber.

In producing the gradations by admixture with tone, the necessary tints are: aureolin and tone; Naples yellow and tone; yellow ochre and tone; vermilion, Naples yellow, and tone; madder lake, Naples yellow, and tone; vermilion, yellow ochre, and tone; Indian red, yellow ochre, and tone; madder lake, yellow ochre, and tone. The proper gradation in each is produced by a greater or less admixture of tone, as before.

CLOUDS

Cobalt, aureolin, and tone; French ultramarine, vermilion, and tone; ultramarine, Indian red, and tone; ultramarine, raw umber, and tone; ultramarine, raw umber, Naples yellow, and tone.

CLEAR EVENING SKIES

In clear evening skies the following tints will be found to be very serviceable: madder lake, aureolin, and tone; madder lake, light red, and tone; madder lake, light red, yellow ochre, and tone.

LIGHT CLOUDS

These can be introduced in the first painting, or rendered in the second painting, the preference being for a complete sky in the first painting, as previously suggested. Violet grays are chiefly required for this purpose and can be composed of varying proportions of French ultramarine, light red, and white; ultramarine, light red, madder lake, and white; ultramarine, light red, yellow ochre, and white; ultramarine, light red, aureolin, and white.

If the tone is to be very bright and pure, use vermilion instead of light red; if, on the contrary, the tone is to be more somber, Indian red should be used instead of light red.

High lights should be rendered in stiff or heavy color; and unless you are working on the abbreviated commercial system, it is best to leave them for the second painting.

One of the chief blunders of the beginner is the laying in of too great a stretch of one color or tint, which he then attempts to alter and divide into variations of color values; with the discouraging result of miring himself in the "mud" that quickly manifests itself when this is done. It will also be found that a thin film of color, after being laid, may be greatly altered by the addition of more and different color, especially if there is no white in it. If the color contains white as a base, the change cannot be so easily effected.

Also bear in mind that it is much easier to raise color values after they are on the canvas, by introducing white, than it is to lower them, especially if they contain white as a base, as just mentioned. This should always be borne strongly in mind.

Observing these simple rules in the beginning of your career as an artist, will help to develop your ability and skill to a point that will enable you to fairly play with color, and manipulate it to your advantage, almost as you please. A professional artist simply revels in color, and plays with it, creating his effects with no apparent effort. But, except in very rare cases, this apparently easy performance is the result of hard, conscientious study, much practice, and self-denial over a long route.

DISTANCES AND SKY LINE

The *sky line* is the boundary between the horizon and the sky. In order to record the truth and solidity of nature, it is of first importance that this boundary be indicated in a manner so far free from indistinctness and from confusion with the sky as to preserve a good general shape. It often happens that it is the strongest line in the whole composition.

Distances are rendered with the same tints as those used in the sky, somewhat strengthened, however, by deeper gray tones. Distant mountains will often have their summits well defined, even by color as well as lights and shadows, when their bases are not visible. This is caused by the mists which are constantly exhaled from the lower altitudes; more noticeable at sunset and sunrise than through the day, although never entirely absent. Throughout the day they are simply less intense. Distances should be treated broadly, omitting detail, and indicating only masses of light and shadow.

MIDDLE DISTANCES

As we approach the foreground, a trifle more distinctness of color must be indicated, but only in a faintly perceptible degree. If too much color is introduced, aerial perspective and atmosphere will be sacrificed. Middle distances should be gray in quality and with just a discernible lowering of the value.

The tints for middle distances are produced by a graduated admixture of:

Tone, with ultramarine and vermilion.
Tone, with ultramarine and light red.
Tone, with terre verte and light red.
Tone, with terre verte and vermilion.
Tone, with terre verte and Indian red.
Tone, with terre verte and madder lake.
Tone, with terre verte and brown madder.
Tone, with terre verte and Prussian blue.
Tone, with Indian red.
Tone, with vermilion.

TREES

It is of first importance in painting to represent and indicate the different varieties of trees. It is accomplished rather by rendering the nature of their trunks, branching, and general sway than by reproducing their color and leafing. When near the eye, the masses of foliage, as well as the general or local hue and tone of the verdure, should be carefully observed and studied; keeping in mind the mood of the day. A figuratively truthful rendering would be marked by a clever manner of handling, rather than by a futile attempt to delineate each leaf with accurate fidelity. The

latter method would at once stamp your effort as the labored attempt of a novice.

It is well to reiterate here that the greens of the land and trees must gradually partake of the aerial tone that pervades the middle distance, in proportion and ratio as the objects recede toward the horizon. Yet, if the mood of the day is bright sunshine, the accidental touches of the sun's rays, even in middle distances, should not be ignored, but be made the most of, as they will greatly assist in breaking up the monotony of the landscape. These bright spots should be rather golden in quality and yet carry enough of tone to force them to hold their place in the "key."

STEMS AND TRUNKS OF TREES

Lay in the trunks and heavier branches in full natural color, plus tone, in proportion to their remoteness from the foreground. Introduce details and general character at the same time, using a pointed sable, small or large—whichever will accommodate itself best to the detail in hand. The extremities of branches must be rendered less intense in color than the trunks and intermediate sections of the branches. If this precaution is not taken, the trees will appear "hard" and "flat."

FOLIAGE

Foliage can be laid in with plenty of color, freely mixed with megilp, which will impart a rich, pulpy appearance. Then, with a small sable pencil, form and model the irregular masses of foliage into definite shapes. Escape into the depths of the shadows with decided dark touches, which will prevent the whole from being flat and heavy. Work into the retiring "spots" with more delicate opaque tints; this will take away the effect of too much sameness, and will afford agreeable relief to the advancing branches. Spots of sky showing through foliage should, if possible, be the result of the first painting and so left. These spots of sky can be accented later if found necessary.

For greens in shadow there is no need of blue; they may be composed of black and different yellows; the olive-toned greens and especially so in the scant or open masses, best rendered with thus produced are soft and agreeable.

Foliage, even in masses, should have a feeling of looseness, a quick, flicking touch from a pointed brush, varying the touch as the formation of the mass dictates. Again, foliage can be represented by using an old, worn, bristle brush. Crushing the brush vertically into the color on the palette will cause the hair to diverge irregularly from the ferrule; thus charged, the brush is held loosely between the thumb and finger, and a short, quick, jerky stroke is resorted to, followed by further manipulation with small sable or bristle brushes.

Grass and stalks are introduced by flicking a finely pointed sable or bristle brush in an upward, natural, quick stroke.

FOREGROUNDS

While it is suggested that foregrounds are to be rendered in full color, it is not meant that the color values are to be crude and raw. The intent should be that of distinguishing between a "glaring" and a "glowing" color. Greens especially should be warm and rich, not coarse and raw; and they can be controlled by uniting burnt sienna, madder lake, or carmine with them in a just proportion sufficient to reduce the rawness.

"Raw" color will always produce disagreeable false notes, very discordant to the rest of the key, and will be just as painful to the eye of one whose senses are attuned to color, as a discord or false note in music is to the ear of a trained musician.

CLEANING BRUSHES

Free the brushes of all surplus color and rinse them in turpentine; then wash them in strong soap and water, rinse in clear water, and pass the hair of each brush between the thumb and forefinger, smoothing it into its natural shape, and lay it away.

SETTING PALETTE

Set or place the colors along the outer edge of the palette and quite close together; starting at the extreme left with blacks and blues, then the yellows, then white, lastly the reds. This will give, as noted, a simplified primary palette; or, to be more explicit, a grouping of high and low primaries.

STUDIES

In the beginning it will not be necessary to purchase a lot of "studies" to work from. The art dealer almost everywhere makes it a part of his service to rent studies by the week at a cost to the student of only a few cents. These, in connection with poses of natural objects in still life, such as pottery, books, and flowers, will afford the really ambitious student an abundance of model material. This plan can be greatly reinforced with direct sketches from nature in landscape painting.

It is strongly recommended to the beginner to make use of the beautiful colored studies supplied by art dealers, as comparatively easier; the color is right before the eyes and thus can be the more readily matched. It is the same with the drawing;—by supplementing the colored studies with actual nature studies, an agreeable balance can be maintained as far as models are concerned.

It will be found upon trial that direct sketching from Nature is somewhat baffling, especially as to color. This element of uncertainty, which is most discouraging, will gradually disappear as your interpreting sense increases.

In carrying out the advice offered, the habit of close and

continuous application for several hours together must be formed: and consistent with thoroughness in the work, the utmost speed should be aimed at. This experience will be found most valuable when working direct from Nature. Without sufficient speed, the work will suffer by reason of time limit. Landscapes rapidly change in mood, especially at sunrise and sunset, and the same can be said of most flowers.

FLOWER STUDIES

It is best, therefore, to pose flowers in a vase filled with water, to keep them from wilting or changing; it is also well to set your palette before cutting or posing the flowers.

Garish and raw color must be as studiously avoided in flower painting as in any other accepted branch of art. Too many bright-colored flowers in strong light will produce these effects when not supported by sufficient half-tone and shadow.

The same kind of flowers which are rendered in light should be repeated in half-tone and sometimes in shadow. When due sacrifice is made by the introduction of a proper amount of half-tone, the result, in skillful hands, will be refinement and interest, instead of crudeness and garishness. To add light to light and dark to dark, is a golden rule in painting, and its effects are to be seen in good pictures, regardless of subject. Composition, light and shade, and color are all essential in a true and complete work of art; and whichever of these qualities is absent from a floral composition, it is, in that particular at least, imperfect.

VIII

PAINTING HEADS

Before passing on to the subject of painting heads and analytical palettes, it may be well to repeat that, in order that the colors, as a whole, may be considered well handled, they should be of full body in the lights, and thin and of little substance in the shadows and obscure masses; or, if not so in fact, they should be made to appear or seem so by transparent glazes.

Each color in the whole assemblage should appear clean, pure and fresh, in its primitive beauty and luster; and give proof of an intelligent, light, easy and firm hand. Nothing in its management should seem clumsy, labored, heavy, or daubed. Too long or unskillful working should not have sullied or tarnished it, by teasing it too much, embroiling it with its neighboring tints, or by jumbling it muddily with those of the ground. It should be

delicately melted at its extremities, with due neatness and address, into the neighboring colors, or united with them by sympathizing tints, judiciously managed.

In the whole manipulation there should be found neither leaps nor jumps between the tints which touch. All should be blended and graduated with extreme nicety. The contours of each object should especially be melted, with the greatest intelligence and propriety, into whatever serves them for a ground. For, if they be too little so, they will appear hard and dry, cutting on their ground like scissors-work, and the object will appear like a scrap picture pasted into position. On the other hand, if contours are rendered too soft, there will be a fusion of background and object, —as much to be regretted as the other extreme.

This is all happily controlled, however, by rendering the shadow side of objects with a soft line, with suitable accents properly placed. The edge of the object on the light side can with propriety be given a line having greater definition and also properly accented.

Most, if not all, professional artists, after setting their palettes with the primary grouping, compose but five or six tints, and then dip with their brushes into the parent-colors, to take from them in that manner a multitude of tints, mixed on the palette with the brush or brushes, just as they want them. But to do this, one must know something—one must even know a great deal, or at least have had considerable practice; and to attain to this facility, it is necessary to know beforehand the effects produced by the different mixtures.

Now, it is precisely by the analytical method about to be indicated, that one will learn to know these effects more easily and better than by groping one's way at random. It cannot be said, however, that on this knowledge, which is purely practical, and based upon a sort of calculation, depends all the art of a great colorist. Assuredly not! The artist most familiar with all the resources and power of the palette, will never be more than a very ordinary or even a bad colorist, if nature has not endowed him with that delicate perception which is to painting what exactness of ear is to music.

HEADS—ARRANGEMENT OF THE FLESH-TINTS FOR THE FIRST PALETTE

Proportion the colors by parts, of which each will compare in bulk to that of a small hazel nut. Let this stand as the unit part by which you will gauge color quantities, for either large or small performances. In this suggestion, we will assume a three-quarter size head, and add that a brief experience will dictate the quantity required for a given piece of work; but it is far better to err on the side of too much than to prepare too little.

On the center of your ground glass slab (which in preliminary mixing is more convenient than the palette) you place the following:

First, flake white	12 parts
Second, Naples yellow	2 parts
Third, yellow ochre	8 parts
Fourth, Roman ochre	4 parts
Fifth, light red	5 parts
Sixth, burnt Roman ochre	3 parts
Seventh, vermilion	1 part
Eighth, blue black	4 parts
Ninth, Prussian blue	2 parts

These are the unmixed or parent colors needed, and of them, and of their combinations that follow, you will arrange, in rows of three, *gradations of tint,* as indicated by number. Place them close to the upper edge of the palette; the pure uncombined colors (marked "1" in the following lists) at the top of each row to which they may belong, and the rows beginning at the right of the palette, and ranging to the left according to number, the "first row" being at the extreme right.

To the right of this first row you set a portion of clear white, in order to take from it as you have occasion to modify your tints. For observe, once for all, that these tints, however well you may compose them, will rarely, if ever, be exactly what you want. They are merely the nearest approach to it, your observation directing what you will need to add from the parent colors,—red, or blue, or yellow, or any other of the nine unmixed colors,—in order to bring them to the precise tone desired.

This will be in your power, because, after all your combinations are made, there will still be left a portion of each of the original colors on the slab, which you will lift separately with the palette knife and deposit in distinct heaps, in a line, on the left hand and at the extreme upper edge of the palette; placing them in the order in which they are numbered above, the white being at the right of the line, and going left, so that the extreme heap on the left is No. 9.

We have used the word "heap" so that you may remember not to spread your tints; for the more compact each color is kept, the longer it will keep fresh. Reminding you now that your rows of prepared tints are on the *right* of the palette, while the virgin rows occupy the *left,* we proceed to indicate these rows in their order.

BRIGHT FLESH TINTS

First Row

1. Vermilion, pure.
2. Same, with as much white.
3. Same, with four times as much white.

The manner of preparing the tints in this row will answer, once described, for all the rows. Of the portion of the original heap of virgin color which you separate on the slab, you deposit one-half in its place at the top of the palette as previously indicated. This is No. 1. The other moiety you mix with an equal part of white. This forms No. 2, which you place directly under No. 1, just removed from the slab to the palette. The small quantity remaining on the glass slab forms the third tint, by adding to it enough white to make it a light rose tint.

These first three tints of the dead coloring serve merely for the rose color in the broadest light of the cheeks, and to color the lips in the liveliest parts. For all the rest, and especially in male carnations, the second row is preferable.

(Wipe the slab a little, but not particularly.)

Second Row

1. Light red, pure.
2. Same, with a moiety of white.
3. Same, with a great deal of white.

For the tints of a wine-red or rose, and which are less lively than those of the first row.

(Wipe the glass lightly, occupying the same mixing space.)

Third Row

1. Light red and yellow ochre, half and half.
2. Same tint, with a moiety of white.
3. A little residue of the preceding, with a great deal of white.

The two last tints, especially the third, serve to make the local color of the flesh in the broad lights, adding still more white if required.

(Wipe the slab a little.)

Fourth Row

1. Light red and twice as much yellow ochre.
2. Same, with a moiety of white.
3. Same, with a great deal of white.

In very pure and brilliant carnations, like those of many young children and even young women, substitute vermilion in place of light red, to make the second, third, and fourth rows.

We have intimated that a portion of each virgin color was reserved at the head of each row. This portion reserved should be equal in bulk to what has been hitherto employed of the color.

We now pass to tints more or less broken with blue black, for the demitints and shadows.

Begin by mixing up a part of blue black with a fourth of cobalt blue. This mixture you will place upon a corner of the

slab, in order to combine it with all the reserved colors No. 1, of which we have just spoken. Make this more copious than the others.

Fifth Row

1. Vermilion, and a fourth as much of the blue black mixture.
2. Same, with a moiety of white.
3. Same, with a great deal of white.

These tints are violet in hue, for certain parts of the lips and inside corners of the eyes, called lachrymal points. The red should predominate.

(Wipe the slab a little.)

Sixth Row

1. Light red, mixed with a fourth of blue black mixture.
2. Same, with a moiety of white.
3. Same, with a great deal of white.

For violaceous grays less lively than those of the fifth row, yet with the red still predominant.

(Wipe the slab a little.)

Seventh Row

1. Light red and yellow ochre, the same that has been reserved in the pure color of the third row, to which you will add a fourth of blue black.
2. Same mixture, with a moiety of white.
3. Same, with a great deal of white.

For the demitints which come next the lights and whose hue does not partake of the violet-gray, but rather of the local color of the flesh in the planes that begin to retire, that is to say, those planes which do not receive the light in front as respects the eye and position of the artist.

(Wipe the glass a little.)

Eighth Row

1. Light red, mixed with twice as much yellow ochre; the reserved tints of the fourth row, with which you are to combine a fourth of blue black.
2. Same mixture, with a moiety of white.
3. Same, with a great deal of white.

For the demitints that begin to partake of the greenish cast, so that the red is not to predominate here,—an intention which is provided for by the preponderance of yellow in the mixture.

(Wipe the glass a little.)

Ninth Row

1. Blue black, pure, with a fourth of white.
2. Same, with more white.
3. Same, with a great deal of white.

For blue eyes, as well as for all tints that are more or less bluish in the flesh, the white of the eye, etc., or to add to the violaceous tints where red must not predominate.

(Wipe the glass a little.)

Tenth Row

1. Blue black, with which you will mingle rather more of the yellow ochre than there is of the black, and a very little vermilion.
2. Same, with a moiety of white.
3. Same, with a great deal more white.

For the greenish or greenish-gray demitints which still partake a little of the local color of the flesh. This is why a little red is combined with it, though the greenish quality must predominate.

(Wipe the glass a little.)

DEMITINTS NEAREST THE SHADOWS

Eleventh Row

1. Blue black, with an equal quantity of yellow ochre and a very little light red.

For the bluish-green tints which already come under the category of the weaker shadows.

2. The same mixture, with a little more yellow ochre, and a little Naples yellow, but very little.

For the yellowish-greens that fall into the same rank of weaker shadows.

(Wipe the slab clean.)

Twelfth Row

1. Naples yellow and light red, equal parts, with a fourth of blue black.
2. The same, with a little more red and Naples yellow.
3. Same as 2, with still a trifle more of Naples yellow (which is to serve for heightening).

These three tints will serve for reflected lights, and can be modified into greenish, grayish, or more or less orange, according to the nature of the reflections. But you are not to add the least particle of white, because here, if the reflections appear a little luminous, it is only by a borrowed light, or one which is cast into the shadow by a neighboring body, a colored flat plane, such as a screen, colored wall of the room, etc. In such a case it is rare

indeed that white has to be added; if it is used, it is bound to solidify a reflected light and force it to look "chalky," which is bad.

Reflections must be soft and luminous, with no feeling of hardness or "chalk" in them at all.

(Wipe the slab clean.)

Thirteenth and Last Row for the Flesh Tints

1. Brown ochre, with a fourth of blue black.

2. Light red and yellow ochre, equal parts, with a fourth of blue black.

3. Light red, still more yellow ochre, and less than a fourth of blue black.

These three shadow values may be modified at pleasure by making more or less abundant one or even two of the virgin colors that compose them; for the blue black represents the blue, and the two the red and yellow, which are the three primary colors that tint all the objects of Nature.

In painting a head it is imperative that the hair, linen, part of the drapery, and the background should receive immediate attention. These accessories should be partially rendered or laid in, that their edges, where they border on the flesh, may be melted or softened. Also, by treating them at the time the flesh is laid in, they will serve as comparative color values, and greatly assist in establishing and holding "key."

THE PALETTE COMPLETED BY THE TINTS FOR THE ACCESSORIES

There are certain tints to be added to the above palette, and these will now be given.

Fourteenth Row

FOR HAIR IN GENERAL

1. Black, burnt Roman ochre, and Roman ochre;—for the broadest and strongest shadows of the hair, or for the local color of very dark hair.

2. Black, yellow ochre, and light red;—for the local color of chestnut hair, or for the shadows of fair hair.

3. Black, Naples yellow, and light red, when it is very fair;—for the local color of fair hair; letting the yellow predominate, using very little black, and sometimes adding white for highest lights, but only at the end of the brush.

(Wipe the slab clean.)

Fifteenth Row

FOR LINEN

1. Black, pure, with half white;—for the strongest shadows; and you may add, according to the tint, a little yellow and less of red.

2. The same mixture already made, with more white;—for the weaker shadows; and you may add, according to the tint, as before.

3. Blue black, pure, with a still greater quantity of white;—for the pale demitints.

4. White, pure and alone;—for highest lights.

Sixteenth and Last Row

FOR BACKGROUNDS OF APARTMENTS OR OTHERS THAT ARE NOT SKIES

1. Black, light red and yellow ochre—more or less of the one or other, according to the tone desired;—for the lowest or most obscure sections of the ground; and if the ground is to be very dark, this tone will be made with black, burnt Roman ochre, and Roman ochre.

2. Same mixture, with a fourth of white;—for the local hue of the ground.

3. Same as No. 2, with a great deal more white;—for the lightest parts of the ground.

Note.—It is to be understood that, if you have exhausted the nine parent colors with which you started, to make up these additional rows, it will be necessary to express the necessary quantity from the tubes; for the portions placed as a reserve on the left of the palette at the top are not to be disturbed for this purpose.

SOME OBSERVATIONS ON THE ADVANTAGE TO AN ART STUDENT OF A SYSTEMATIC AND DETAILED ARRANGEMENT OF THE TINTS OF HIS PALETTE

Where the drapery or linen touches the flesh, it is necessary to prepare the tint in this first palette, as we have already said, indicating the general method; but not otherwise.

According to the nature of the linen, as coarse or fine, bluish or reddish, you will, as suggested, make your grays more or less mixed with yellow and sometimes with a little red, for coarse linen; and compose it exclusively of white and blue black for fine linen. But it is the nature of the folds, as more or less heavy and large, that marks particularly the texture; and, besides, fine linens always have more or less transparency, so that they rarely present harsh and deep shadows, or whites that are perfectly white.

The *background* depends upon the nature of the subject, but you will make grays more or less brownish, bluish, greenish, etc., by giving predominance to one or other of your three primaries, so that the head, hair, and drapery shall detach themselves without harshness, and in a tender, harmonious manner.

The brilliant parts of dark hair are usually of a tint colder and grayer than that of the local tone, being a reflection from the light of the sky. They borrow from it the gray tint, more or less

bluish in proportion to the greater or less depth of the local color. Where hair is fair or very light chestnut, these lights are often golden, or more or less yellow. In this case Naples yellow is preferable to white. It covers equally well and is less cold. In the extreme high lights a little white can always be added on occasion. But it is not in the dead coloring that these details are important; with the resources of your palette as indicated, you will not be at a loss for the tint you want.

In fine, we repeat that while this plurality of tints is not usual with professional artists, and not intended for them, we cannot too strongly recommend its adoption by beginners. They will thus have no hesitation and consequent loss of time, and will be tempted to no experiment that will be prejudicial. Nor will they grope their way painfully and by slow degrees, to find at the end that it must all be retraced;—a course which, though for peculiar geniuses it may sometimes result in good—a great good, to which no instruction not derived from their own observation and experience could probably have led them—yet in ordinary cases will terminate in absolutely nothing, or leave the explorer lost in inextricable error.

On the contrary, while taught the resources of the parent or primary colors, and the principles of combination, the student has before him a palette that he *knows,* with which he can operate almost with his eyes shut—such is its convenient arrangement and the methodical succession of the tones. Remembering the chief color of each row (or even making a note of the Nos. 1 to refer to), he knows at once that the tint directly under it is the same with an addition of white, and that the third, or one directly under this again, has still more white; while for the shadow-tint, where no white enters, its place, he recollects, is occupied by yellow. Thus he is without any embarrassment.

IX

THE FIRST PAINTING

A professional artist usually prefers to draw in his design directly on the canvas, because the feeling with which he is inspired communicates itself more surely in this manner to his outlines. Yet the transferring of a previous sketch to the canvas has many advantages, one of which is of moment to the student, namely, the surface of his canvas is not worried by going over and over and over again, line after line, erasing, restoring, and re-erasing the contours of his subject—which is infallibly the case with an un-

practised hand. Preferably, he designs his subject on paper, corrects it there coolly and with safety, and with better opportunity of assuring himself of its exactness; then, when it is perfectly to his satisfaction, he conveys it to the canvas by either of the following methods of transfer:

Rub the back of the drawing with dry English vermilion, or powdered charcoal, or bolted dry whiting, dusting it lightly to remove surplus, and fasten to the canvas with a couple of gummed wafers at the top corners, the chalked side of the paper next to the canvas. Retrace the drawing with an 8H lead pencil. The bottom of the paper being left loose, it can be raised from time to time and the progress of the tracing noted.

This is by far the best method, if the drawing is small.

2. On large drawings, we simply use a heavy Manila paper, and convert the drawing into a *pounce pattern* by perforating the outlines of the drawing with a perforating wheel, the Patent Swivel preferred, which is sold by all art dealers.

Lightly sandpaper the back of the pattern and fasten in position; pat and rub with a pounce bag, which is made by taking squares of cheesecloth (two thicknesses will do); fill with powdered charcoal and fold and tie the corners together. After pouncing, you will find the drawing transferred to the canvas in a fine dotted line.

The transfer being effected by either of the methods given, the design is ready for "fixing" or "inking in."

Take burnt sienna and grind with a little Japan gold size and a few drops of turpentine, and then with a fine pointed sable pencil retrace the entire drawing in "fine line." Also indicate the principal shadows by carefully blocking them in, paying very close attention to the edges of the shadows; after which the shadows can be massed with a wash or glaze of sienna.

Introducing strong and broad touches in their proper places, without "dryness," will add a great deal of expression to the contour, and enable you to establish the shadows with less distrust and hesitation.

All is now ready for the first painting.

THE PROCESS OF FIRST PAINTING, OR DEAD COLORING

You begin with the masses of your principal shadows, which you lay in, without entering too much into detail, with a soft brush charged with burnt sienna, keeping it transparent as in washing. Modify the tone by adding a little burnt Roman ochre, to cover certain parts, as in the nostrils, the line of the mouth between the lips, and in the corners, as well as in the thickness of the eyelids,—in a word, everywhere that the hue appears sanguine.

Do all this freely, without trembling, and be not too assiduous

to render your shadows very uniform; for this is but a first preparation. This method has the advantage of giving you some idea of the relief and general effect.

Now take up five or six bristle brushes of a suitable size, charge one of them with one of the most luminous of your flesh-tints, of those in whose composition there is yellow ochre, red, and a great deal of white, and impaste in a broad and full manner all of your finest lights, as if you were laying in the whites of a design on gray paper. You take for this, not the palest of your tints, but one of the lightest among the local flesh-tints; for you reserve the liveliest and most brilliant light to be given in the finishing.

Your local lights thus placed, you lay next them the tints, still very pure, that accompany them on all sides; taking for this purpose a tint which is now somewhat less luminous, though still without admixture of black or blue.

You proceed thus, by a gradation of tints, until you reach the flying-tints, which begin to be somewhat sullied and broken by the bluish black; that is, the progressive tints *from the fifth row to the tenth inclusive.* You will take the greatest care to employ each one of them only in proportion to the degree of light it expresses, having regard at the same time to the tint more or less rosy, yellowish, violaceous, greenish, grayish, or bluish, wherewith the part or plane is colored that you at the moment are at work upon. But be careful how you exaggerate these broken tones in the demitints; for they and the local color must form one harmonious whole, whose component parts are imperceptible save to the eye of the artist,—a scale whose nice degrees are measured off and registered only in his own mind.

From the demitints you reach insensibly the shadows, and finally the reflections, whose tints are comprised in the *tenth, eleventh,* and *twelfth rows;* so that you are called to cover again the brownish washes first established. Observe, in the first painting, to keep the shadows a little warmer, yet a little less obscure, than you mean they shall appear in the completed work; the reasons will develop themselves to your observation before your work is ended.

Do not seek to unite your values by teasing them into one another with the brush. If the gradation we have indicated seems hard of accomplishment (and we are ready to admit that it has some difficulty, and always gives some trouble even to a tolerably practised eye and hand), yet it is by such a method only that purity, relief, and softness can be obtained in any degree approaching perfection.

When your tints are laid together, each in its proper degree of value, so that at a certain distance the effect seems gained by this means alone, then, caressing them, as it were, with a clean brush, or sometimes with one charged with color (of the right tone) and following the directions of the forms as they appear in

the model, you can melt your values together in a few moments, and the work is over.

A FURTHER COMMENT ON GRADATIONS

If the student ask how he is, without experience, to know whether the tint he is about to annex to one already laid be its proper neighbor and if his eye at the very outset is to be the sole judge, it is answered, no; he can test every gradation on his palette, so that his work upon the canvas may be unhesitatingly clean and true to key.

Thus, suppose he has laid a tint in its proper place, and is in doubt as to what precisely follows it. He has but to take a brush stroke of *that tint,* and beside it on the palette he strokes a sample of one that is analogous but somewhat lower in value. If it be found too discordant, upon comparison, or not yet sufficiently broken, he mixes with it, at the end of his brush, a portion of the first color value. But if, on the other hand, it appears too similar for the faintly perceptible gradation requisite to force the plane being rendered to *turn,* he dips into one of the neighboring rows for a value less bright, and so on. Very soon, if he has any aptitude at all, this testing of his color values will be unnecessary.

To exemplify the foregoing further, let us suppose that you are now about to paint the cheek and part of the jaw of a youthful face that is full and of a fresh carnation; and setting out, as suggested, from the brightest and freshest tint, you wish to reach the most vigorous part of the shadows by insensible and just gradations. Where is found the broad light of the swell of the cheek, lay local flesh tint, bright (but not the brightest, as that must be reserved later for high lights), keeping it to the limits which the form and tone prescribe. Take now a portion of the tint which is above it in its row, and which you know is deeper in tone; mix it with the former, on your palette, and with the brush add or retrench until satisfactory. Place this new tint next your broad light, keeping strongly in mind the formation of the plane.

Compose in like manner a third tint, which you will stroke upon the palette next to the second, and to which you have added a hue of rose a little more decided. Spread this in like manner beside or all around the first two tints, according to the requisitions of the model; then a fourth, and a fifth tint, always a trifle stronger in color, until you reach the part of the cheek that is decidedly rose.

Next, compose with the brush, and in proportion as you have occasion for them, two or three rose-tints, increased in color until you reach the liveliest blush that Nature affords. Arrived here, you begin to degrade your rose, and to render it progressively less lively, by adding to it a little of a lilac or faint violaceous tint; then a little more still, and so in succession, as you get nearer the

jaw or turning of the cheek, until the rose color is lost, confounding itself by degrees with the violaceous-gray, bluish, greenish, or yellow-reddish demitints or halftones bordering the shadow. On the shadow side you lose the tint and escape quickly into the mass of shadow, properly so called.

Enumeration of this variety of broken tints which we have mentioned, partial as it is, would sound preposterous to the ordinary observer who cannot see them in Nature. Yet the artist must know and be able to distinguish them and render them to the last degree of nicety in order to produce a truthful representation. This almost infinite diversity of color,—of which we have indicated above but one example,—it is needless to say, is not really existent in the skin, but merely an appearance caused, in the first place, by the shadows and by a partial obscuration which makes the halftones or demitints, and, secondly, by the effects of light upon the down of the skin. It is this down, almost imperceptible in the light, which modifies to infinity the tones composing the demitints.

REFLECTIONS

Reflexes, or reflections, properly speaking, are visible only in the shadows, because of their necessary feebleness as compared with direct light; and they follow the same law as the shadows, taking their color solely from the local color of the objects that send them their light, and form that of the general mass of the surrounding atmosphere.

Reflexes, then, may vary tint and light almost to infinity, according to the case and to the objects causing them. But, as they are always of a duller tint than the real lights, nothing hinders one from waiting to spread the general mass of shadow before rendering them (unless the reflection happens to be of very great extent, which means, ordinarily, that it is likewise more than usually bright); otherwise they must be added to the particular shadow when laid, taking for the purpose a tint brighter than the latter, and calculating beforehand what tone it will assume when combining with the shadow-color, which is "fresh."

Note.—"Fresh" color is color freshly or newly laid, with no lapse of time considered.

ADDITIONAL HINTS FOR THE COMPLETION OF THE FIRST PAINTING

You have now but to add certain spirited touches in order to complete the dead-coloring of your carnations. These touches are given, some in the lights, others in the shadows, but more especially in the features of the countenance, and even in the broadest light of the forehead. You commence with this latter; you pass to those of the nose; you observe if there is anything to

add to the bone of the cheeks and about the eyes; thence you descend to the mouth, and finally come to the chin, and to the ears.

Be careful to compose the tints as they should be, for these different touches; though brighter, they must each participate of the color, more or less broken, of the feature or part they are applied to. And not only in this respect, but also in their form and proportion, their analogy to the part must be well considered before using the brush; for these isolated touches are to be made with freedom and boldness, otherwise they would lose their designed effect.

Having, in the first place, retouched the lights, you will be better able to preserve the proper harmony in giving the enforcing touches or accents than if you reversed this order, in which case it is probable you would have indicated the latter too strongly. Accents are to be given where too much softness exists, and where character and transparency are lacking. The most essential are usually those which are required in the eyes, particularly in the pupil; in the nostrils, in the separation of the lips, and sometimes in the corners of the mouth, etc., the whole depending, not only on the likeness, if it happens to be a portrait, but also on the degree of vigor which the under values have already.

In general, the accents should be of a warm tone, rather than dark gray and cold. The nostrils and the line between the lips, especially, should be rather sanguine in the first painting, reserving for them a subsequent modification when finishing the picture, which is comparatively easy; whereas it is often difficult to superinduce transparency and communicate a degree of sanguine depth to touches that are laid in *too black* and opaque. Remember this, and do not fear to exaggerate a little these sorts of accents in the so-called cavities of a head. In the first painting, however, avoid doing it to excess.

COMMON FAULTS OF BEGINNERS

In the bright values there is a fault that all beginners are apt to commit in the painting of the eyes. Not only do they represent the ball of the eye too white, not observing that it is never purely so, but they also make the visual point, or little speck of light which is visible on or near the pupil in various positions according to circumstances, both too white and too large. With the model before them a due observation will correct any error in this respect because it is, we are convinced, in most cases the result of mere routine; forgetting or not taking the pains to ascertain, the great variety of appearance this part presents, according to the direction of the light, the pose of the model, and the formation of the eyes, orbits, and lids. The careless student is apt to plant the little glint just where he has seen it done by others, and make it too white, too thick, and too large, regardless of the propriety of so doing.

A hard and too defined manner of rendering the eyelashes is another defect that betrays the hand of the beginner. Eyebrows should be painted with very tender touch, even when they are very thick and black. The line must not be equally dark throughout its length and, moreover, it should be accompanied, both above and below, by tender demitints, which will prevent its appearing like the stroke of a pen, as one sees it round the eyes of dolls. A like remark applies to the other vigorous touches, in the nostrils, mouth, and so on. They are in general the stumbling-blocks of amateurs.

Nevertheless these touches must be made with decidedly knowing stroke; they lose in quality if teased or "sweetened" too much. It is rather by the exactness of the color-value that they should be in harmony with the rest of the head than by means of a lengthened and, as it were, stumped work. For should the touch appear too hard when placed, do not try to remedy it by jumbling it with the under color. Leave it. It can be painted again and with better success by means of a better value, the more readily because of the thinness of the shadow-value. Be patient, however, until the sketch is dry.

The first painting of the whole mass of your carnations is now completed. It is supposed that in the course of this operation you have at the same time laid in some of the hair (especially where it joins the flesh), linen, drapery, and background,—in a word, some little portion of all the parts that touch the flesh, as we have previously recommended. Here, too, you are to avoid all hardness, blending the extreme edges of the planes of color-values lightly and adroitly, using a small bristle or fitch.

DIVISION OF THE WORK

The first day will be devoted to drawing in the design, or contour of the subject, and when perfected, transferring to the canvas.

The second day is devoted to "inking in" the drawing and allowing it to dry.

The third day is first occupied with the setting of the palette, which will consume in the beginning two or three hours, and a much less time after sufficient practice. The model or study is then posed and the dead-coloring commenced, working two or three successive hours, with intervals of five-minute rests for the model, and twenty-minute poses. Then a good rest, resuming to employ two or three hours more before sunset, or before the light changes too much. In this length of time the flesh of the first painting, together with accessories, should be completed.

The fourth day will terminate the entire first painting, including hands and arms, drapery, and background.

The fifth day will be devoted to accenting and retouching the entire painting.

BACKGROUND AND ACCESSORY DEAD-COLORING

For your background, you should calculate the tint and vigor so as not to destroy the values of your shadows, and yet to make sufficient opposition to the lights of your carnations and of the accessory parts.

As a general rule, the tint immediately about the head should be more somber than the demitints of the flesh, and lighter than the real shadows in the head, in order to give a feeling of space between the ground and the figure, and consequent isolation and detachment from the latter. Nevertheless, for some striking effects, a deviation from this rule (which is but general) is occasionally desirable and often practised.

But avoid the plan which is sometimes followed, of making one side of the ground altogether dark and the other, in like manner, light. This produces, in a simple bust, a bad effect, quite unnatural. In large compositions, or where there are more than one figure, such bold effects often appear to advantage, and where the extent of the canvas permits, even in the case of a single figure.

In like manner, in the narrow field allowed for a simple bust, the presence of useless accessories, such as curtains, etc., is far from pleasing. These things, in a way, divert attention from the head, without offering in themselves any compensating merit. Where the arms are added in a canvas of a little more extent, these trifles are not only not so much misplaced, but sometimes become necessary to support the pose. However, all things should be rejected from a design that have neither splendor nor importance, and can in themselves add no merit to performance.

The color of a ground that represents no particular scene or objects should not be too uniform. You may add to it large confused patches or spots, such as might be shapeless, indistinct clouds of diverse tints melted together and almost insensible. They are to be kept well toward the edges and corners, and should lose themselves imperceptibly in the neighboring parts, and at some distance from the head. The whole must be managed with discernment and without affectation.

Treat all the accessories in the dead-coloring in a large manner, not entering into minute details either of the folds of the draperies or of the hair. By preparing them in grand masses in which the general effect is well expressed, you will not be embarrassed by petty details when you come to finish. Show a full freedom of action which will be sufficiently precise, reserving a more serious effort for the second painting.

DRYING THE FIRST PAINTING

Tilt it forward from the top, leaving it the while on the easel, and so place it that it will receive no direct rays of sunlight. Never tilt a painting against a wall, face in.

X

THE SECOND PALETTE

Now comes the arrangement of the second palette, in preparation for the second painting. A systematic arrangement of this palette is as follows:

Flake white	12 parts
Naples yellow	2 parts
Yellow ochre	8 parts
Roman ochre	4 parts
Light red	4 parts
Burnt Roman ochre	3 parts
Vermilion	1 part
Rose madder	3 parts
Scarlet madder	3 parts
Burnt carmine	2 parts
Burnt sienna	1 part
Ultramarine	8 parts
Blue black	2 parts
Cassel earth	1 part

Proceed as in the setting of the first palette, and apply the same indications, in every respect of manipulation and arrangement, to the present palette.

First Row

1. Rose madder, pure;—for glazing the liveliest parts of the lips.

2. Same, with a little white;—for the freshest parts of the cheeks and lips, etc.

3. Same as No. 2, with a little more white;—for the lips and luminous parts of the cheeks in rich complexions.

Second Row

1. Vermilion, pure;—for certain fine values in the lips and elsewhere.

2. Same with a moiety of white;—for values less fresh.

3. Same as No. 2, with a great deal of white;—same purpose.

Third Row

1. Vermilion, light;—to take from, as you have occasion, for certain lively tones.

2. Same, with a moiety of white;—for values less fresh than the two first, or to render the violaceous tints more roseate.

3. Same as No. 2, with a great deal of white;—for the same purpose, in the lights.

Fourth Row

1. Vermilion, and as much yellow ochre.
2. Same, with a moiety of white.
3. Same, with a great deal of white.

These three tints, and especially the last two, are local flesh tints in the luminous parts.

Fifth Row

1. A part of the mixture No. 1 of the fourth row, adding to it again a moiety of yellow ochre.
2. Same, with a moiety of white.
3. Same, with a great deal of white.

For rendering the more yellowish parts in the lights about the mouth, parts of the neck, etc.

(Wipe the glass clean.)

Sixth Row

1. Light red, pure.
2. Same with a moiety of white.
3. Same, with a great deal of white.

These serve to imitate the values less lively.

Seventh Row

1. Scarlet madder and burnt Roman ochre, equal parts.
2. Same, with a moiety of white.
3. Same, with a great deal of white.

Reds somewhat violaceous, for certain parts of the lips, of the nostrils, of the ears, and sometimes of the nose.

Eighth Row

1. Scarlet lake, as much light red, and a moiety of ultramarine;—for hues decidedly violaceous in the lips, cheeks, etc.
2. Same, with a moiety of white;—for the lilac tints which are often found about the eyes and elsewhere, as in the lips, etc.
3. Same, with a great deal more white;—same purpose.

(Wipe the slab clean.)

Ninth Row.

1. Ultramarine, pure.
2. Same, with a moiety of white.
3. Same, with a great deal of white.

To take therefrom, on occasion, bluish tints more or less dark or light, when you are called upon to modify (at the point of the brush) certain tones, whether for the white of the eyes or for the bluish lilac tints, and so on.

(Wipe the glass a little; and now make use of reserved moieties of your pure colors No. 1.)

Tenth Row

1. Vermilion, light, with as much yellow ochre, united with one-eighth part of blue black;—for the broken tints and the insensible gradations of the planes that *turn,* which are not yet strong shadows.

2. Same, with a moiety of white;—for lighter tints, weak demitints, and planes that *turn.*

3. Same, with a great deal of white;—same purpose.

(Wipe the slab a little.)

Eleventh Row

1. Vermilion with twice as much yellow ochre, and a fourth blue black.

2. Same, with a moiety of white.

3. Same, with a great deal of white;—for the tints somewhat reddish-green, though still partaking a little of the local color of the flesh; for certain dull demitints, as in the lower part of the face, etc.

(Clean the slab.)

Twelfth Row

1. Ultramarine with as much yellow ochre and a fourth of rose madder;—for the broken greenish hues.

2. Same, with a moiety of white;—for the greenish demitints more or less light.

3. Same, with a great deal of white;—for the same purpose.

(Wipe the slab clean.)

Thirteenth Row

1. Blue black, a half less of yellow ochre, and a fourth of the volume of the two together, of rose madder;—for the broken bluish-greens near the shadows or beard, etc.

2. Same, with a moiety of white;—for the broken bluish-greens of the demitints.

3. Same, with more white;—for the same purpose.

One may add to these demitints, at the point of the brush, more or less madder, according to the case, and sometimes even an atom of vermilion.

(Wipe the slab clean.)

Fourteenth Row

1. Blue black and yellow ochre, equal parts.

2. Same, with a moiety of white.

3. Same, with more white.

Pure greens, to take from on occasion, when you would modify a value that has been rendered too red or too yellow-red on the canvas.

Fifteenth Row

FOR REAL SHADOWS WHERE NO WHITE IS ALLOWED TO ENTER

1. Blue black, as much Roman ochre, and a fourth of scarlet madder.

2. Same, adding a fourth of Naples yellow.

3. Same, with a little more Naples yellow.

Broken warm greens, to couch upon parts found too red, or to modify a value at the end of the brush. The 2 and 3 for the same uses in planes more light; either reflexes or demitints.

(Clean the slab.)

Sixteenth Row

REFLEXES WITHOUT WHITE

1. Burnt Roman ochre, as much Naples yellow and a fourth of their united volume of blue black.

2. Same, with less of the black.

3. Same, with still less of the black.

The tints of the different reflections are varied by adding more or less of the three colors, which is done with the brush as the occasion calls for it.

(Wipe the slab clean.)

Seventeenth Row

1. Burnt Roman ochre, with a third of blue black.

2. Same, adding a third of Roman ochre.

3. Same, adding, besides, a third of Naples yellow.

Take from the parent colors more or less of the three here indicated, when it is necessary to modify a tone, either to make it more or less yellow-reddish, or more or less yellowish, or more or less violaceous; for all depends upon these three colors, the red, the yellow, and the blue black.

(Clean the slab.)

Eighteenth Row

Burnt Roman ochre, a fourth of Roman ochre, and a third of blue black;—for the most vigorous parts of the shadows; can be modified at pleasure.

2. Same, with a little more Roman ochre;—for parts more ruddy and less vigorous.

3. Same, with the addition of a little Naples yellow;—for parts still less vigorous.

(Wipe the slab.)

Nineteenth Row

1. Burnt carmine (with a little gold size).
2. Same, with a moiety of burnt sienna.
3. Scarlet madder.
4. Same, with a moiety of burnt sienna.

These four hues are very dark browns, while at the same time they are sanguine and more or less warm of tone. They serve for the most vigorous touches in the finishing of a head; add a little gold size to each, at the point of the brush, as you use them.

(Wipe the slab.)

Twentieth Row

1. Burnt sienna;—for certain very warm touches, as well as to take from on occasion.
2. Cassel earth;—to be used in the pupil of the eye.

(Wipe the slab.)

Here, as in the first painting, the parts of the hair, linen, etc., that touch or border the flesh, are to be provided for in the same palette. Renew color supply from the tubes, if the supply first taken is exhausted. The supplementary tints to be mixed are as follows:

Twenty-first Row

1. Ivory black, pure, with two or three drops of gold size;—to take from on occasion, as well as for black drapery shadows.
2. Same, with a moiety of white.
3. Same, with so great a portion of white that the white will appear but little changed;—for the parts of linen that are not altogether white, or to mix with other grays.

Twenty-second Row

FOR LINENS, BACKGROUNDS, ETC.

1. Black, a third of white, and a little burnt Roman ochre and raw Roman ochre.
2. Same, with a little more of both ochres.

These two warm grays serve for the deep shadows of linens, or for their reflexes, modifying the tint at pleasure. They answer, too, for the shadows of the white of the eyes, and especially for the portions of the ground that touch the flesh.

As applying to the foregoing scale of chromatic combinations, what has been said of the preparatory palette must be also said of the second palette, namely, it is intended for the student or beginner at his outset only, his own observation being sure to dictate, as he advances and gains experience, a very considerable diminution, not merely in the compound tints, but likewise in the parent colors that head the series.

XI

THE SECOND PAINTING FOR THE HEAD

What has been said of the first painting method will apply in like manner to the finishing stage of your work. As in the first painting, you begin at the forehead. You lay in next the brightest lights, not forgetting to reserve therein certain still more brilliant values to be given subsequently as the extreme high lights.

Then follow with the different gradations of tints, but with still more regard for the exactness of tone than was observed in the first painting, and with still more care not to sully them by teasing. Paint at the same time a part of the hair at its insertion, as well as of all objects that border or touch the flesh, in order that you may melt them with due tenderness one into the other.

When your masses of light are well established, as well as their gradations into "local flesh," pass to the neighboring tints, which are now demitints more or less broken in diverse tones, yellow-reddish, bluish, violaceous, greenish, etc., comparing with the most scrupulous attention the value of these in relation to the high lights and to the general mass of the local flesh tint. Proceed thus by due degrees to the strongest demitints, and finally to the shadows and reflexes.

It is by a sustained attention to compare continually the values of the demitints in relation to the lights, and the values of the shadows in relation to the demitints that you will succeed in rounding your work and making it faithful to the model. Of the shadows we have already said sufficient to supersede the necessity of detailing the mode of treatment here. The transparent colors in which they are rendered, which allow the warmer and yet lighter shadows of the sketch or first painting to show through, altered to the required tone by the medium of this colored glaze, give a great power of modification in the shadow values, if discreetly managed.

The reflections are rendered in heavier color than the shadows, but less impasted than the lights; and you are to avoid, as much as possible, the introduction of white in their makeup. Use Naples yellow instead, which is sufficiently opaque and luminous.

As for the mode of modifying any of your various tints when the tone, as you have mixed it, proves not sufficiently exact for what we may call your diatonic scale of color, or "key," it is fully explained in the first painting chapter preceding, and it is recommended that you give the method several careful readings, and pass at once to certain special details concerning the second palette.

PRECAUTIONS RELATIVE TO THE EYES

It is about the eyes that we find most usually the finest values. The surrounding skin being of greater delicacy and more trans-

parent, the rose tints take a violet cast, or a bluish tint is predominant, etc., according to the complexion, age, health, and sex of the model, lighting effects used, etc.

We have already warned the beginner against painting the ball of the eye too white. The same caution is to be observed now. For the pupil, the more the face is painted in profile, the more oval it must be represented to follow Nature; as more of the face is seen, so the pupil appears more round. Be very careful to avoid hardness in the exterior circle of this part: melt it into the white of the orb by a scarcely perceptible bluish-gray tint.

In the internal angle of the eye, do not exaggerate the red of the caruncle, that little triangular mass of pulpy and bare flesh which separates the two lids; nor make it too large. And endeavor to represent the slight humidity which constantly moistens and gives sparkle to the orb.

If you look at the eyes in front, at a reasonable distance from the model, you see the lashes of the upper lid, not as single hairs, nor even as hairs at all, but as a dark semicircular narrow mass, or line of shade, varying in breadth as the head turns, but always less apparent in that part of the lid which is next to the nose, while in the lower lid the shade is only just perceptible, except in very dark persons or where the eyes are unusually well fringed. So, then, represent the eyelashes; and here, too, all hardness is to be avoided, the line being blended harmoniously with the flesh by means of tender demitints. Also represent the thickness of the lid, if visible, as can be noted in "quartering poses."

Also bear in mind the precaution relative to the eyebrows, against the usual error of beginners in making or rendering them too hard and too uniform. The flesh must first be prepared which is seen through the hairs, and which is more or less shadowed by their mass. Over this preparation, which must be laid very thin, the brows themselves are to be painted, according to the shape, color, and thickness. What has been said of the lashes, of the mode of expressing them with proper softness, and of delineating them only as they present themselves to the eye of the artist when a reasonable distance from the model, applies likewise here.

NECK, SHOULDERS, AND BREAST

In general, however white the neck of a woman may be, it should not be so luminous as the brightest lights of the head, because in the usual vertical position the light generally glides from it instead of catching upon the salient parts. Yet if white, and of a fine carnation in the model, it should not appear less pure in the painting. It is not, then, by reddish, yellowish or yellow-red tints that you will succeed in the gradation, but by light tints of bluish, greenish, or even violaceous demi-gray.

The choice will depend upon the natural appearance, though often different parts or planes of the neck will appear in different

places of one or other of these tints, and again of a certain combination of all of them at once. Observe, consider, essay, until you have the exact tone, which is usually so delicate that at first sight it will seem impossible to seize it. Yet it is to be done; otherwise, in endeavoring to degrade the color so as to throw the neck into its position under the jaw, you may get the tint too yellow, too green, too brown, or too livid, or in some other way falsify Nature and destroy the bloom and freshness and produce a sad discordance with the face.

The slope from the termination of the neck to the shoulders takes upon the edge that turns a flesh tint somewhat more golden, that is, having a yellow-reddish cast, owing to the thick and strong muscle that forms and swells the part. The thickness of the skin in such places almost always communicates a slight tinge of the sort, though it must be observed that variations from this general rule are not uncommon.

There are many women who have the muscles of the neck less white than the local tint of the face; others, again, with whom it is just the reverse; so that there is no absolute rule in this respect, except it be that which is surest of all, which is to paint what you see, avoiding exaggeration, and preferring to make all the tints rather too fresh than too ruddy.

Take now the local tints of your purest and most luminous carnations, in order to paint the chest and bosom so as to make their prominence from the neck perceptible. All the broken demi-tints by which you give roundness to the breasts and mark the swell of the chest should be exceedingly beautiful, pure, fresh, and of insensible gradation; that is, they should have but little vigor, and melt imperceptibly into the local values and light of your carnations. Use a full brush of firm color, rendering the parts with freedom and softness, avoiding too exact an anatomical detail, which would be bad taste.

ARMS AND HANDS

For these, the variety of tints is less, though their volume is greater than in the palette of the face. The management is much the same; it demands only greater boldness in the execution and, in general, a somewhat heavier impaste of color, but not to excess. The local color of the arms and hands as well as of the breast should be in harmony with that of the head, so that a brunette should not have those of a blonde, nor a blonde those of a brunette.

RECAPITULATION

We return to the coloring, in order to repeat and extend certain general observations that are of vast importance to the serious student.

In the second painting, be sure to avoid grayish and opaque tints in the strong and deep shadows; keep them transparent and

of rather a warm tone, which may sometimes be even a trifle sanguine or ruddy, according to the carnation to be imitated. However, be careful not to exaggerate in this respect, or misplace your touches. These sanguine and "lakey" tones are confined to certain parts, such as the interior of the nostrils, the ears, and other parts wherein the effect calls for such warm values, though less sensible, and which are at times manifest according to the lighting of the model. The modifications resulting from reflexes are also to be noted and imitated.

Be very sparing of the demitints. The nature of their composition will permit of no exaggeration. The introduction of demitints is a very subtle operation, and if not properly graded, with a tendency to render them too strong, instead of keeping them in "key," comparatively delicate, the result will be livid and cadaverous. It is chiefly for this reason that it is recommended that they be used with tactful discrimination at all times.

Observe that where the skin is stretched upon the bones, as in the forehead, at the cheek bones, etc., the lights, though still fresh, take a tint that is somewhat yellowish in cast.

Never detach in a hard, dry, and cutting manner the contour of the face, nor of any rounded or retiring part, but melt them softly (without, however, losing the form) into the background, neck, or such other part as they border on.

Always avoid entering into details that are minute and insignificant, or rendering with too much precision and distinctness those that should be shown in a broad manner and without dryness. The average beginner believes that such particularity is more than essential to correct imitation, and sees approach to successful performance in the dry, hard, facsimile of trifling details. It is true that we have the "literal" school of art, which has many exponents, notably among commercial artists, where the current demand calls for very literal and realistic creations. But it will be noted, upon close inspection of "literal" works, that absence of unimportant, hard, dry detail is the first thing encountered. Then we have the "impressionistic" school, which deals entirely with "abstracts," with no literal interpretations whatsoever. Between the two schools there is a happy medium of expression which will be found agreeable to both artist and patron.

XII

DRAPERY

A FEW GENERAL HINTS

In order that a drapery, of whatever sort, should present an agreeable appearance, it should be so arranged as not to conceal (while covering) the form of the model. That is to say, the salient parts of the body and limbs which appear through the drapery should be made evident in their true forms at all times.

Avoid, as much as possible, folds that are parallel and too similar. In a standing figure, they will, however, always be more or less so. In thick fabrics the folds form large masses and are few in number. This is desirable; do not seek artfully to multiply them. In draperies that are thin and supple, the folds are necessarily more numerous and smaller. Manage, however, to have some large general masses present themselves distinct from the petty folds, both to avoid monotony and for the effect of accidental shadows.

It is seldom that variegated or figured fabrics are in good taste in painting, though there are occasions when they may become of significant propriety. In the case of embroideries, only those parts of the pattern or design that catch the light being in relief on certain of the grand folds are to be detailed with any precision. They should not be painted with too great a thickness of color, which would give them a disagreeable feeling of heaviness. If white, the values must be varied so that clear white will only appear in the extreme high lights.

As for the sections of the embroidery that are discerned in the retiring parts, or those that turn off, it is essential that they be indicated merely with grayish whites; and far from essaying to express the pattern with neatness, they should, on the contrary, be rendered in a vague and interrupted manner, as they appear to us at first sight, and not on close attention.

The imitation of different fabrics depends chiefly upon the character of the folds and, in the next place, upon the appearance they present as rough or smooth, dull or brilliant. This is evident by their easy representation by various means, such as simple crayons or the strokes of the graver. Even their texture, as coarse or fine, is denoted in the same manner, so that color has but little or no part in their indication. This is as a general rule, for in the case of satins, velvets, and some other stuffs of silk, we perceive that the configuration of the folds, though important, does not hold the principal place. Thus, satin, with its large, sufficiently remarkable folds, is distinguished still more by its singular brilliancy and the beauty of its reflection. The lighter stuffs of silk that are lustrous, and whose smaller folds differ not only

from those of satin, but from each other, according to their kind (and this with sometimes a marked peculiarity, as in those of Florence silk) are likewise distinguishable by their splendor and power of reflection, each in its own degree and manner.

Velvet and plush have a different peculiarity, which is manifest in the retiring planes of the folds. Where other stuffs would have demitints or halftones, they display vivacity and light, the salient parts being almost always dull and somewhat dark, though not in the degree of the stronger shadows and of the deep concavities. All of these characteristics will be readily visible to the artist when he has the stuff before him, for otherwise he would hardly attempt their representation.

Diaphanous stuffs have this difficulty in their imitation,—that they present a complication of folds in all directions which are perceived one through another without being absolutely confounded nor yet perfectly distinct. The under parts must be first established in a tender and vague manner without paying too much attention to the superficial folds which cover them. This done, there is little embarrassment.

In a general way, these stuffs are rendered with thin color, which helps to give them the light and delicate appearance they should have. They are usually white, but when colored, the best mode of rendering them is to lay them in *in white;* then when dry, glaze in the desired color, doubling the force of the glaze and even tripling (where the folds are doubled or tripled on one another). You add or diminish the intensity of the value of the glaze, without the risk of destroying the formation of the drapery, and at the same time you can sacrifice, with broken grayish tints, certain parts that are found too lively, or, by a touch of white, add vivacity to others.

When, however, it is a black or other dark colored gauze that is cast over a drapery of light hue, it must be painted at once in proper color and value, using very thin color. For the rest, all transparent draperies should be treated lightly with a free movement, without attempting a lot of petty accidents of detail which, far from adding to the effect of the work, would have a tendency to greatly injure it. It is not precisely negligence that is demanded; it is a spirited manner of painting that characterizes merely what deserves to be characterized, and requires a great deal of taste and tact, so that the whole together satisfies the view, though done freely and at little cost in effort.

You will encounter very little difficulty with drapery if you will observe the same care as is demanded in the other phases of your work. Simply render all of the values as you find them, taking great care not to overstep the boundaries of planes. Render the shadows first, follow with the local color of the drapery, and finish with the high lights; softening the edges of the planes a trifle in order to melt them into an agreeable whole.

XIII

EXPLANATORY GLOSSARY

Accidental points.—In perspective drawing,—those vanishing points that do not fall on the horizontal line.

Accidents.—The term applied to the representation of such effects in landscape as may be supposed to be transient, whether of light or shadow; such as the partial shadow of a passing cloud.

Aerial and perspective.—This is to the hue of objects what *linear perspective* is to their form; and as it is by the just diminution of lines and planes that the latter enables us to judge of the proper shapes and dimensions of objects and to calculate their respective distances, so the former contributes a most powerful assistance to the same effect by gradations of color and by the diminution of the vivacity of light and the distinctness of shadow, which chromatic gradation and enfeeblement of the clairobscure are owing to the interposition of atmosphere between the eye and the object; whence the name.

Air.—Used in its literal sense, to express the atmosphere which does or should appear to surround a figure in painting so that the canvas is forgotten, and the figure appears as though in actual space and not as pasted on a flat surface or ground. The same expression is applied to a landscape, where the air can never be wholly wanting, its presence being made more or less sensible by the variety of distances. However, to be perfectly represented, and so as to be a marked feature in the excellence of the painting, its perspective must be well considered.

Antipathy of colors.—As there are certain colors which, when mixed together, produce a compound tint that is agreeable and correctly termed "friendly," so there are others that in their mechanical, chemical, or chromatic combinations never harmonize, and such are correctly termed "enemies."

Bear out.—Colors are said to bear out when they appear in their full vivacity; the force of the term will be comprehended at once on observing the effect of varnish upon the parts of a picture that have dried dull, without the least bit of lustre.

Blooming.—The softer varnishes, to which class mastic belongs, are liable, through the effects of damp, to what is technically called "blooming."

Body.—Applied either to prepared pigments or their vehicles, as regards their substance and consistency. In either, when existing in a great degree, it supposes opacity, which in pigments makes them reflective of light. Yet as vehicles may have some body without losing their transparency, so may pigments that are ranked as transparent be with perfect propriety said to possess it,

when their tinting power is very great, which is the case with Prussian blue and Indian yellow.

Boldness.—Directly opposed to timidity, in art as elsewhere, and the best way to define it is to indicate its opposite. Very high finishing is apt to injure boldness, in drawings as well as painting. Both boldness and finishing should be regulated by the nature of the composition, its proposed situation, or place of exhibition; for instance, a mural painting hung high in the dome of a public building, or a large frieze in the same building, would necessarily receive broader and bolder treatment than a small canvas "on the line" in an art gallery.

Breadth.—This important term of art is applied to both design and coloring. Breadth is usually indicative of a master, as the want of it almost always accompanies the work of an amateur. When the lights of a picture are so arranged that they seem to be in masses, and the darks are massed to support them, so that the attention of the spectator is powerfully arrested and kept bound, we have what is called the "breadth of effect," which is mainly produced by the coloring and clairobscure. In design, a broad manner will most readily be seen in the cast of the draperies.

Bright.—This word, like many others in the language of art, is often equivocal. Thus we apply it to a light in a picture, and mean that it is lively or vivid, and speak of a tint or color in the same breath, and mean that they are pale or of little intensity.

Broken Colors.—Those which are made by various combinations of the primary colors and their compounds. In Nature, as in art, there is but little color seen that is not broken; yet in art, a want of judgment may carry the principle of "breaking" too far, producing what is more expressively than elegantly called "mud."

Carnations.—All the flesh in a picture may be comprehended under this term, though it is usually confined to the upper parts of the body. Synonymous with *Flesh-tints.*

Cartouches (Fr.).—Ornamental panels adapted to certain inscriptions, mottoes, arms, and other devices. They have acquired this appellation by being, in general, representations of paper, rolled, folded, or returned at the ends.

Certainty.—The just medium between hardness and meaningless softness of outline.

Chiaroscuro.—An Italian compound word signifying simply bright and obscure, or light and dark. In art the name regards all the relations of light and shadow, and this independently of coloring, notwithstanding that in painting color and the clairobscure are in their very nature inseparable. The art of clairobscure, therefore, teaches the painter the disposition and management in general of his lights and darks, with all their degrees, extreme and intermediate, of tint and shadow, both in simple objects or components, and in combination as a whole, so as to

produce the best representation possible, in the best manner possible, and thus produce the most desirable effect upon the senses of the observer. In a word, its end and aim are fidelity and beauty of imitation,—chromatic harmonies, effects of light and shade, chromatic values and contrasts, gradation of atmospheric or aerial perspective, reflections, etc.

Clairobscure.—Same as Chiaroscuro.

Chromatic.—Pertaining to colors.

Crudeness.—Rawness, immaturity, or a want of knowledge, judgment, and skill, which may be manifested in the coloring or the design, or in the effect of the whole picture. It may and usually does occur in the first attempts of the young artist, without indicating or marking a want of aptitude.

Decision.—The term applied to form or outline opposed to vagueness; yet, when true in just degree, it is far removed from hardness, stiffness, or dryness.

Demitint.—Applied to tints that are neither light nor shadow, but hold the middle place between them. The proper modern term is "half tone."

Detail.—A minute portion, usually expressed in a plural sense.

Dry.—Usually applied to a sharp and frigid preciseness of outline, as injurious to grace, or true relief; but it may be used with regard to any of the elements that make up a picture, or to the effect of the whole.

Effect.—By "effect" in painting, is understood the energy and beauty of the optical results of the combinations, either accidental or arising from calculations well understood, whether of the lines, or of the tones, bright or dark, or of the colors or the tints.

Enforce.—By enforcing a shadow, we mean adding to its depth, or to its intensity—giving it in fact more force. We never speak of enforcing a light, but of heightening or raising it.

Execution.—The mode of performance, which embraces everything concerned with brush manipulation and general handling.

Finish.—Very great care to finish some parts of a picture is apt to injure the effect of others. It is apt also to weary the mind of the artist, and thereby injure the liberty of his hand. But when finishing is united with freedom, when it is delicate and light, its effects cannot be too much appreciated, especially in small works.

Handling.—The manner in which the artist uses his brush or pencil; his manipulation, as seen in the execution of his work.

Hard.—Used either with reference to design or coloring; thus, an outline that cuts too sharply against its background is said to be "hard"; but the term is more often employed when applied to the whole of a picture, to denote a want of tenderness, modesty, and truth in the coloring. Hardness is often the result of a laborious effort to display "high-finishing."

Heighten.—To heighten or raise a tint, is to give it more vivacity and brightness; that is, to render it in a lighter value; which is done by opaque colors that reflect the light.

Horizontal line.—A line that marks the horizon, or place of the supposed horizon, and which is always on a level with the eye. The point in the horizontal line directly opposite the eye, and which in fact represents the place of the eye, is the point of sight, and the ray issuing from the eye terminates in this point, and forms a right angle with the horizontal line, and is consequently horizontal to the plane of the picture, and is called the principal ray; and the point of distance is the actual distance of the eye from the plane of the picture, as measured on the horizontal line from the point of sight. Vanishing points are the points in which parallel lines converge perspectively, which points in level planes are in the horizontal line; namely, either in the point of sight itself or more or less distant from it according to the position of the observer. When, owing to the obliquity of the surface, these converging points do not meet in the horizontal line, but above or below it, they are called accidental points, as noted under that head.

Hue.—The hue of an object is properly its color, whether simple or compounded, without reference to light or shadow; whereas *tint* is applied to those varieties of color that are produced by the admixture of white, which gives them a greater or less degree of light; while shade or shadow indicates an addition of darkness to a color, simple or compounded, by means of black or deep colors.

Imitate.—From the vocabulary of a well-known French treatise published at The Hague in 1708 we quote the following excellent maxim: "When it is said that we must imitate the antique, or the manner of such a master, it is not meant that we should copy line for line what is painted or designed or sculptured, but that we are to form for ourselves a like idea, and work upon the same principles, and in the same taste."

Impasto (Ital.).—Expresses the appearance arising from the manner, good or bad, common or peculiar, of laying on or spreading the colors, which is presented by the paint of a picture, regarded without reference to light or dark, hue, tint, or shade; though not without consideration of the nature of the object represented,—for this will materially vary it with any skilled artist. So we say, a good or bad impasto, thick or thin impasto, solid, meager, rich, poor, labored impasto, etc.

Labored.—Said disparagingly of a work in which the pains taken and the labor expended are too perceptible.

Lame.—Said of a figure in whose members the harmony of proportion, and proportion itself, have been neglected.

Local.—The local color of any object is the general inherent color of the object, unmodified by light or shadow, demitint or reflection; by the atmosphere in perspective, or, in short, by any accident whatever.

Masses.—If you consider a picture as made up of a number of principal parts, which parts are the aggregate or assemblage of major parts, those principal parts are called the masses, as the minor parts are the details. And to mass a part, is to reject those minute details which seem to cut it up into little pieces. To illustrate, if you take the forearm and strip it of the skin, you will see, as it were, a bundle of tapering bands of flesh, whether you view the arm inside, outside, or laterally, but appearing more numerous on the outside. Now, if you represent all of these muscles with equal anatomical distinctness, merely veiling them with the skin, you will fall into error. If, on the contrary, you give prominence only to the principals, the result will be that of sinking the details and bringing forward the mass; and this is called "massing the part," and is in fact imitating nature, not dissected anatomy.

Minute.—A measure or subdivision for the parts or divisions into which artists distribute, for artistic measurement, natural objects and architectural designs. It is, however, quite indeterminate, and therefore can convey no fixed idea of dimension. Thus, the Italian designers will divide the human head into twelve parts, and each part into six "minutes"; whereas the more usual division with English artists is of four parts, and twelve minutes to each part. *"Module"* is the modern term, which is the same thing.

Monotone, or *monochromatic.*—Of one color, but in a series of values of that color.

Oil-out.—To apply oil to the colors when dry, in order to restore them to proper color value.

Positive.—Any of the primary colors, or any combination of them or of their compounds in which a predominating hue is to be distinguished, is called a "positive" color; as any combination that produces neutrality makes what are called "neutrals," or negative colors.

Primary.—Those colors which cannot themselves be made by any combination of others, yet from whose combination all others are derived, are called primary colors. They are red, yellow, and blue.

Retouching.—Doing over a part that is apparently finished, but with which the artist is dissatisfied.

Set.—To set a palette is to arrange the tints and colors thereon in their due order for service.

Sketch.—The ordinary use of this term needs no explanation. As explaining, however, the idea of coloring with that of design, it is employed in a special and important sense, to denote the preparatory painting on a smaller scale, by which the artist guides himself in the execution of a proposed work, whose effect he is thus enabled to calculate with more precision.

Teased, or *tormented.*—Said of colors that are worked about to their own detriment and that of the picture.

Tone.—The student must not confound tone and tint, especially when the latter is used in its ordinary indefinite sense for color. Two colors may be the same, yet their values different; and again two colors may be directly opposite, yet their values the same. A distinction that will be perfectly obvious to the student, if he recalls the first observations he must have made in his first work, namely, of the change of appearance which took place in a color already laid, on his placing another next to it: the color, tint, hue, or shade was just the same, but its neighbor had either lowered or raised its tone. Therefore, to tone a picture is to harmonize its whole coloring, to bring its various values, as well as various colors, into due relation with one another (which implies subordination, and the grand result of subordination, which is unity) and cause to disappear all crudeness, and maintain the "key" throughout the whole composition.

Technique.—A term used by artists to signify the manner in which the pen, brush, pencil, or other tool is used.

XIV

DRAWING FROM NATURE

In drawing from nature the principal thing to attain is facility in draftsmanship. Drawing from the living model is the best possible foundation for a masterly knowledge of draftsmanship, irrespective of your final intention.

In making a drawing from the living model, careful posing is of first importance. Take especial care to show both hands and at least one foot. When the hands and feet are hidden, much necessary training is thereby lost. Rapid memorandum notes or rough sketches, dashed off in a few minutes, are a waste of time for beginners. It is immaterial how long it takes to make a drawing. You can work a whole week on one pose if necessary, but every part should be in correct drawing and carefully thought out.

Find the center of the paper and indicate it with a slight dot of the crayon. Find the imaginary straight line in the figure by the aid of a little plumb line, held a short distance from your eye, regardless of the distance you are from the model. You are not, however, to strike a visible perpendicular line on your paper; you must establish this line in an imaginary way, and begin blocking in your action and proportion, making use of many lightly drawn lines, striking in the longest lines first.

Do not allow yourself to strike in a black line or a curved line, and do not attempt to draw any portion of the pose with a

single line. This would be disastrous. Use many, very many, light lines, parallel to each other. Form a series, as it were, in which the true line will manifest itself involuntarily as you proceed. Strive for the principal masses of form, omitting the details entirely; study the edges of the shadows and block them in also.

This done, proceed to tone the figure with a lightly executed gray, and follow with a massing of deeper tone in the shadows. At this stage of your drawing, you will note that the drawing as a whole begins to assume roundness, which has been accomplished without the use of a single curved line, however short.

You can now add the details. Under no circumstances are you to reverse the operation, putting in the details first—a common fault with beginners. If you were drawing a map, you would naturally indicate state boundaries before those of the counties, counties before cities, and cities before streets. Precisely the same rule applies to a drawing from any natural object. Always observe not only the relative proportion of masses of form, but note what parts are over, underneath, or opposite each other. Finding the perpendicular line will enable you to cause the figure to fall into the desired position on the paper.

After the figure is thus placed, note its "action." If all the weight of the figure fall on one foot, the whole action (or swing) of the figure expresses this very clearly. Every muscle of the body is affected, and if the artist does not feel that the figure is resting on this foot, the drawing will plainly show it. If the model is standing on his left foot, and the drawing does not express it, be sure it is out of drawing. In a figure that is sitting, running, stooping, or in any imaginable pose, there is a characteristic action.

In making a full-length drawing of a female figure in costume from nature, arrange the drapery to give a general impression of the contour of the figure. Do not have the figure entirely hidden away by heavy folds of cloth. A poor draftsman usually shows a female figure as a mass of drapery, with head and feet obtruding from it. The thing to achieve is to make the gown appear as if it were really enveloping a human figure; to suggest the figure underneath by carefully drawing its every curve and line, and arranging all the folds of the drapery to bring out this point.

In drawing a full-length male figure in costume, make a careful study of the folds at the elbows and knees. Show the drapery just as it appears in nature. Draw the shoes very carefully. It is not a bad idea to make careful additional studies of the shoes, either in a corner of the paper you are working on, or on a separate sheet. Probably a man's shoes and hat are the most difficult parts of his apparel to draw properly. In drawing a man's shoe resting on the ground, it will be observed that the toe of the shoe tilts up sharply and naturally casts a shadow. This is a fact that is almost universally ignored by beginners.

To draw a figure of a child will be found quite difficult at first. Children are apt to move constantly and lose the first pose.

In order to measure comparative sizes of different parts of an object, or to compare objects with each other, most artists use the pencil or brush handle with which they are working, as a gauge. The pencil is held at arm's length and on a level with the eye. By holding the pencil horizontal with the object you are measuring, and slipping the thumb up and down as a guide, your eye can easily observe any desired comparative measurement.

In drawing from nature, divide *observing* and *recording* into two distinct operations. Spend very much more time in looking than in putting down. The study—the real work—should be in observing the details of nature with the eye, and reasoning them out with the brain. The work the hand performs in recording the result of these observations is the most unimportant part of picture making. A student who spends most of his time looking at his drawing, smoothing out uneven marks, and doing other unimportant work, will not produce an effect worthy of very serious notice.

Work on the flat surface of the paper or canvas as though you were modeling in clay; that is, push, pull, and bend your larger rougher masses into shape as though you were actually modeling. Speak and think of your work as modeling. This will tend to take away from your drawings the flat look common to the work of beginners.

To make an acceptable scenic or bulletin artist, you must be able to *draw*, as well as *paint,* almost every conceivable object in Nature, as well as articles of manufacture, embracing a great many mechanical objects which must be represented with truthful fidelity as to detail and form.

You encounter the human head and figure in bulletin painting, in an endless variety of poses, serving many purposes. The manner in which they can be made to animate and add human interest to the average outdoor display, constantly recommends the use of the human figure or head. In addition, you must be able to draw animals, flowers, vegetables, fruit, drapery, cloud masses, landscapes, marines, city streets, interiors, household utensils, and sometimes caricature; in fact, anything and everything, and always in a large cast; in the plainest language, big! All bulletin pictorial work must be rendered in a big and more or less broad way; otherwise it would fail utterly in carrying power.

To gain facility as a draftsman should be the one great aim, so that it would be impossible to embarrass you, regardless of subject. But, remember, that the nude human figure is the basis of all true knowledge of drawing. If you can draw the human figure in any pose, nude or costumed, and draw it well, you will be able to draw any object, not excepting an intricate piece of machinery, if you have a model or photograph to work from.

You can obtain a reasonable amount of knowledge and skill from the plates shown in this book. Study them and draw them repeatedly, until you arrive at correctness. In conjunction with copying and study of these plates, it is of vast importance that you work from nature as much as you can. Pose the immediate members of your family a few minutes each day; pose domestic animals, and compositions in still life, etc. The real draftsmanship acquired direct from nature will exceed any copying you may do from plates, by one hundred per cent.

ARTISTIC ANATOMY

Artistic anatomy applies to such interior or exterior parts of the human figure as directly affect the impression it makes upon the eye. The human being is built as follows: The structures are covered (particularly at the joints) with a rough substance called periosteum. The various muscles are placed over this in layers. The membrane commonly called the skin envelopes the muscles, but does not hide their actions.

The skeleton contains about two hundred bones. The entire structure may be subdivided simply, into the extremities and the torso. The torso consists of the head, the ribs, breast bone, hip bones, and the back bone.

The physiological terms, while desirable in the way of general knowledge, are not essentially necessary. There are very few artists who memorize these terms, deeming them of little practical use in draftsmanship. But as a basis of drawing from memory and as an aid when transposing a knowledge of artistic anatomy is absolutely essential. An artist who would draw the human figure successfully in any pose, without a model, must memorize its ideal proportions. The following measurements, if memorized, will be found a great help in achieving this end.

THE IDEAL MAN'S FIGURE

(Front View)

Top of head to chin—1 head.
Chin to breastbone—1 head.
Breastbone to navel—1 head.
Navel to center—1 head, reaching base of torso.
Center to just above kneecap—1 head.
Just above kneecap to beginning of calf—1 head.
Thence to base of calf—1 head.
Base of calf to sole of foot—1 head. Total, 8 heads.
The foot is one-sixth the length of the figure.
The hand is three-fourths the length of the head.
The ankle is one-fourth of a head across.
The calf is a trifle more than half a head across.
The knee at both top and bottom is half a head wide.

The thigh at the widest point is three-fourths of a head in width.

The waist is one and one-fourth head wide.

The shoulders are two heads wide.

The neck is half a head high.

The Ideal Woman's Figure

The comparative divisions are substantially the same as above as to height, but vary considerably in the widths.

The foot is one-sixth the length of the figure.

The ankle is one-fourth of a head across.

The calf is a little over half a head across.

The base of the knee is half a head wide.

The top of the knee is a little wider than the base.

The thigh is three-fourths of a head wide.

The hips are two heads across.

The waist is one and one-eighth head wide.

The shoulders are one and a half head across.

The neck is half a head wide.

The front view head is egg-shaped, the smaller end at the base. A band one-fourth the length of this oval, and placed directly across it (one-third down) gives the position and size of the nose and ears; the eyes are in the center of the skull; the front view eye is divided into three equal parts, of which the pupil is the central one.

The eyes are the width of one eye apart.

The ear is as long as the nose.

The mouth is a little wider than the eye.

The center of a baby's figure is at the navel. A child of three is usually five heads high, the upper part of its figure being three heads; the lower part two. A child of six is six heads high. A youth of sixteen is seven heads high.

PICTORIAL COMPOSITION

Pictorial composition is the proper arrangement of the various parts of a picture to form a harmonious whole. It may be broadly divided into three branches:

First, color composition, or the proper relations of various tones, one with another.

Second, the arrangement of masses of form.

Third, the balance or proper relation of masses of form to each other.

In color composition, the accent color note (the brightest or strongest tone) should be either in the center of the picture or near it, and so placed as to attract the eye to the most interesting part of the whole composition.

The most commonly used style of composition of masses of form is what is called "pyramid" composition. This method of

arranging the various accessories of a picture was used by the old masters and still holds its place today.

It was long ago discovered that good composition meant massing the various parts of a picture together, instead of having them scattered unevenly, and without meaning, all over the picture.

When objects or figures are grouped together, the heaviest part of a group should be at the bottom. This gives a compactness, a solidity, which is restful to the eye. Therefore, figures or objects heaviest at the bottom naturally take the form of a pyramid to a certain extent. By a pyramid is not meant an exact triangular shape; but a line drawn around a group well arranged, would approximate a pyramid.

The simplest way to find the proper balance of the various groups of a picture is to call to mind a "see-saw." If two objects of equal weight are equally distant from the point of balance on a see-saw, the balancing board remains perfectly level. If one object is moved nearer to the center than the other, more weight must be added to the object nearer the point of balance, or the balancing board will not remain level. This same rule applies to the groups of objects in a picture. The group which is nearest to the center must always be the heaviest; and if the "see-saw" idea is always kept in mind, good balance will always result.

Truncated composition has come into popular vogue and was no doubt caused by the poster craze. Its principal feature is the odd manner in which a figure or head disappears out of the edge of a picture. All other rules of composition apply, however, but the picture ends at one or more edges in an unconventional, unexpected manner.

XV

PERSPECTIVE—SECTION 1

GENERAL RULES

In the following pages will be set down all that is needful with reference to perspective as applied to daily work in scenic or bulletin studio. The text and plates are reproduced by permission from "Modern Perspective," by William R. Ware, professor of architecture in Columbia University, who is without question the best authority we have today upon this great and intricate subject.

*Quoting from Prof. Ware's preface, the following paragraph will not be amiss: "In the course of these investigations it will

* Reference to Professor Ware's *Modern Perspective* is made by special permission of The Macmillan Company, publishers and owners of the copyright. Mr. Atkinson highly recommends *Modern Perspective* to every reader of this book. (Price $4.00.)—*Publishers.*

appear that the horizontal plane hardly deserves the paramount importance commonly assigned to it, and that the practice of referring all constructions to that plane is productive of needless inconvenience. The well-known method, also, of points of distance, and points of measurement, which is generally treated as an auxiliary method of but limited serviceability, will be shown to be of universal application, and to suffice for the solution of almost all problems. The development of this method to its legitimate results, leads to the consistent use of the perspective plan, rendering unnecessary the construction of the orthographic plan, by the aid of which perspective drawings are commonly made."

THE PHENOMENA OF PERSPECTIVE

A drawing made in perspective undertakes the representation of objects of the shape and size that they actually appear from a given point. It has to do only indirectly with the real shape and size, being mainly concerned with their apparent outlines and dimensions. Before trying to learn how to draw them, then, it is obviously desirable to find out how they really look. This first section will accordingly be taken up with considering the appearance of things, the phenomena with which perspective has to do. The things in question, as always in the scientific study of form, are lines, especially straight lines; plane figures, especially rectangular figures and the circle; and solid objects, especially the sphere and cylinder. The appearance of solids bounded by plane surfaces is determined, of course, by the aspect of the plane figures that bound them.

1. Certain phenomena in regard to the shape and size of these things are sufficiently obvious. It does not need to be pointed out that everything seems smaller—that is to say, subtends a smaller visual angle—when at a distance from the eye than when near; that, consequently, the more distant portions of a straight line seem smaller than equal divisions near at hand; that in rectangular figures the farther sides occupy less space to the eye than the nearer sides, so that they present, in most positions, a trapezoidal rather than a rectangular aspect, the sides inclining toward one another; that a circle when seen in perspective generally appears as an ellipse, and that the center of the circle does not occupy the center of the ellipse, but is nearer to the farther than to the hither edge.

These *qualitative* determinations are easy enough. But it is not so easy to determine the relations of *quantity,* to tell *how much* smaller a given distance will make a given line appear, or just at *what* angle the sides of the rectangle seem inclined, and in what direction they seem to run. To determine these things with exactness is the chief object of these methods,—an object to be reached through the study of another class of phenomena, the appearances

not of limited and finite lines and planes, but of lines and planes supposed to be indefinitely extended. Indeed, finite lines and planes are, in perspective, considered merely as portions of the indefinitely extended lines and planes in which they lie.

2. The position of the spectator, that is to say, of the spectator's eye, is called the *station point.*

3. *Systems of Parallel Lines.*—All lines lying in one and the same direction, and consequently parallel to each other, are said to belong to the same *system* of lines. Each line is an element of the system. Now if we imagine the lines of any system to be indefinitely extended both ways, we shall encounter the following phenomena:

4. *Vanishing Points.*—All the lines of a system, that is, all lines parallel to each other in space, seem to converge towards two infinitely distant points. These points are called the *vanishing points* of that system of lines. They are 180 degrees distant from each other. The vanishing points of a line are the utmost possible limits of its apparent extension, even though infinitely extended. For a straight line, although infinitely long, cannot subtend an arc of more than 180 degrees; it cannot seem more than a semicircle. The beams of the sun or the shadows of clouds, at sunset, which seem to separate overhead and converge near the opposite horizon, afford a capital example of parallel lines with two vanishing points. So also do parallel lines of cloud, and, in streets, the lines of sidewalk, eaves, and house-tops. They appear as great circles of the sphere of which the eye is the center.

5. Now what is very curious is that whichever element of the system one looks at straight, the others, on both sides, seemingly concave towards it. The horizon itself, which seems straight when one looks at it, seems curved if one looks up or down. Other horizontal lines, when regarded with reference to the horizon, seem parallel to it, and farthest removed from it, where they are nearest the eye; approaching it at a constantly increasing angle as they retreat towards their vanishing points. These singular phenomena, though constantly before our eyes, are little noticed, and consequently but little known; but they sometimes force themselves upon the draftman's attention, causing much confusion in his drawing and in his mind. The fact that most straight lines, all indeed except one, always seem curved, is the basis of the method of curvilinear or panoramic perspective.

6. Either vanishing point of any system of lines may be found by looking in the direction followed by the lines of that system; the vanishing point will then be seen full in front of the eye. That element of the system which passes through the eye, or station point, will be seen *endwise,* the line appearing as a point, coinciding with and covering the vanishing point, which is at its farther extremity. Such a line we call an *optical line.*

7. In like manner, all planes parallel to one another, and

whose *axes* accordingly belong to the same system of lines, are said to belong to the same *system* of planes. Each plane is an *element* of the system. By the *axis* of a plane is meant any line at right angles, or perpendicular, to it.

8. *Systems of Parallel Planes.*—All the planes of a system, that is, all planes parallel to each other in space, seem to converge towards an infinitely distant line, which is the limit of their utmost extension. A plane, though seemingly infinitely extended, like the sea, cannot subtend an arc of more than 180 degrees in every direction; it cannot seem more than a hemisphere. Its limiting line accordingly will be a great circle of the infinite sphere, of which the eye, or station point, is the center. This line is called the *horizon,* or vanishing line of the system of planes.

9. The vanishing line or horizon of any system of planes may be found by glancing along that plane of the system which passes through the eye. On looking in any direction at right angles to the axis of the system of planes, it is seen full in front of the eye. That element of the system of planes which passes through the eye is seen *edgewise,* the plane appearing as a line, covering and coinciding with the vanishing line, or horizon of the system, which is its outer extremity. Such a plane we call an *optical plane.* Such a line is *the horizon,* which limits at once the plane of the earth and the plane of the hemisphere, of the sky. We may call such a line the *vanishing line* of a system of planes, just as we speak of the vanishing point of a system of lines; but as it is common to call any indefinitely extended right line a vanishing line, it is more convenient to speak of the *horizon* of a system of planes, distinguishing the real *Horizon,* or vanishing line of horizontal planes, by a capital H.

10. Any point or line lying in the right line passing through the eye seems exactly to cover and coincide with the vanishing point of the system to which the line belongs. So also any line, figure, or surface, lying in a plane passing through the eye, appears as a right line, and seems to cover and coincide with a portion of the system to which the plane belongs.

11. Vanishing points and horizons have to do only with the direction of lines and planes, not with their *position.* Hence, objects whose lines and planes are parallel have the same vanishing points and horizons, whatever their position to the right or to the left, above or below the spectator.

12. A plane surface upon a solid object cannot be seen unless it is on the side of the object towards the horizon of that plane.

13. It is obvious that all systems of horizontal lines have their vanishing points in the Horizon, and conversely, that the Horizon passes through the vanishing points of all systems of horizontal lines. The same is true, of course, of vertical or inclined planes, and the lines that lie in them or are parallel to them. From these considerations we can frame the following

compositions, which are the fundamental propositions of our system of perspective:

(a) All lines, or systems of lines, lying in or parallel to a system of planes, have their vanishing points in the horizon of that system. Hence:

THE THREE PRINCIPAL RULES OF PERSPECTIVE

I. A line lying in a plane has its vanishing point in the horizon of that plane.

Conversely: The horizon of any system of planes passes through the vanishing points of all lines parallel to them.

Hence: The horizon of a plane passes through the vanishing points of any two lines that lie in it, that is, of any two elements of the plane.

(b) The horizons of all the systems of planes which can be passed through a line, or parallel to it, in any direction, pass through the vanishing point of the system to which the line belongs, and intersect each other at that point.

Conversely: A line, or system of lines, lying in or parallel to two planes, has its vanishing point at the intersection of their horizons. Hence:

II. The line of intersection of two planes has its vanishing point at the intersection of their horizons.

Conversely: If several systems of planes are parallel to the same line, all the lines of intersection of all the planes of all the systems will be parallel to it, and have the same vanishing point.

III. The optical lines and planes will make the same angles with each other at the eye, or station point, that the other lines and planes of the respective systems make with each other.

14. The reader is recommended to take the pains not only to satisfy himself of the truth of these propositions, which he will easily do, but also to verify them by examples, determining for himself, in his daily walks, at what distant points, in the earth or the sky, the vanishing points of different lines are to be looked for, lines horizontal, vertical, or inclined; and in like manner to trace the *horizons* of the different planes he encounters in roofs or walls, exemplifying these propositions over and over again until they become perfectly obvious and familiar.

The vanishing points of the eaves, for example, and of the raking cornices or other steepest line of a roof, are easily found by looking in the directions they pursue. These two directions determine the inclination of the plane of the roof in which they lie. Its horizon is a great circle, or straight line, cutting across the sky from one of these vanishing points to the other. In the case of two intersecting roofs, the vanishing point of the hip or valley that marks their intersection is found at the intersection of their horizons.

15. The discussion of a problem in perspective cannot be considered complete until the vanishing point of every line and the horizon of every plane has been determined.

XVI

PERSPECTIVE—SECTION 2

PHENOMENA RELATING TO THE PICTURE

In the first section we considered the phenomena of perspective in nature; that is to say, certain appearances of the geometrical lines and surfaces with which perspective has to do.

Let us now consider in like manner the principal phenomena, the main characteristics, of a perspective drawing. In so doing we will leave all *quantitative* determinations till later, and assume, or guess at, any dimensions or other data we may need; or determine them by judgment, or by the eye. But as this is just the way that such data are always determined when sketching, either from nature or from the imagination, it follows that what we have to say now is specially interesting to the artist and amateur, since it comprises almost all that he needs in his own work.

16. *The Plane of the Picture.*—The picture is supposed to be drawn upon a plane surface called the plane of the picture, and so drawn that if the picture were transparent, every point and line of the drawing would cover and coincide with the corresponding points and lines of the objects represented as seen from a given position, the station point; the plane of the picture being at a given distance and in a given direction.

17. The distance and direction are taken upon a line passing through the station point, at right angles with the plane of the picture. This line is of course an axis of that plane (4). It is called the *axis.* If the axis is horizontal, the picture is vertical, and this is the usual position. But if the axis is inclined to the horizontal plane, the plane of the picture is at an angle with the vertical direction, as sometimes happens.

18. *The Axis, Center, and Station Point, Perspectives.*—The point in the plane of the picture nearest to the eye, or station point, S, is called the center of the picture V^c. It is the point where the axis pierces it. The distance from the station point to the center is the length of the axis.

19. The representation in a perspective drawing of a point or line, or of the vanishing point of a line or system of lines, or

of the vanishing line, or horizon of a plane or system of planes, is called the perspective of the point, or line, or vanishing point, or horizon. Figure 1 represents the picture-plane, PP, as a transparent plane on which is drawn the perspectives of the lines behind it. The perspectives of the lines drawn on the vertical plane

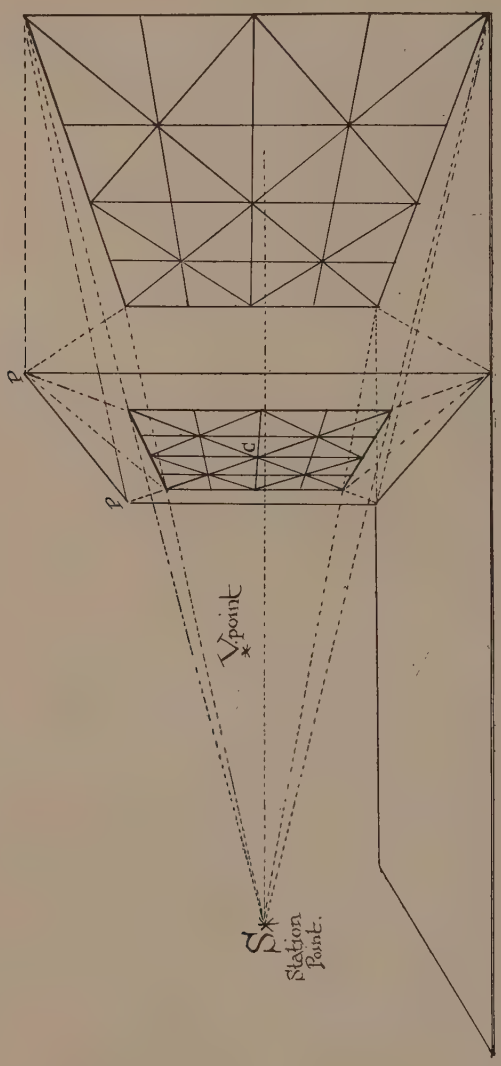


Figure 1.—Picture Plane.

behind it, and which are consequently parallel to the plane of the picture, are parallel to the lines themselves, whether horizontal, vertical, or inclined, and though shorter, they are divided proportionate to them. The perspectives of the lines at right angles to the plane of the picture, however, differ from them in both magnitude and direction. This illustrates the following propositions:

LINES PARALLEL TO THE PICTURE

20. Lines parallel to the picture-plane, whatever their direction, have their perspectives drawn parallel to themselves; that is, in their real direction. The magnitude of the perspective of any such line is less than that of the real line, according as the distance of the line itself from the picture is greater, but its parts are proportional to the corresponding parts of the line represented.

21. When such lines are parallel they have their perspectives parallel to each other, and to the lines themselves.

LINES INCLINED TO THE PICTURE

22. The perspectives of lines not parallel to the plane of the picture are not parallel to the lines themselves nor to each other, but are drawn converging towards a point which is the perspective of their vanishing point. In this case, as the real lines *seem* to converge towards their real vanishing point, so their perspective representations *do* converge towards the perspective of their vanishing point.

23. Hence, if the picture-plane be vertical, as it usually is, the perspective of the horizontal lines that are parallel to the plane of the picture will be horizontal and parallel, that of inclined lines parallel to the picture will be parallel and inclined at the same angle with the lines themselves, and that of all vertical lines will be drawn vertical and parallel. All other systems of lines, whether horizontal or inclined, will have their perspectives converging to the perspective of their vanishing points.

24. Of the two vanishing points belonging to every system of lines (4) one will, in general, be behind the spectator, and one in front of him; this last will be behind the plane of the picture, and its perspective will be somewhere in the plane of the picture and at a finite distance. But if the lines of the system in question be parallel to the plane of the picture, the perspective of both vanishing points will be at an infinite distance upon it, in opposite directions; and lines drawn to them will, of course, be parallel (20).

VERTICAL LINES

25. It is often asked why the apparent convergence of vertical lines is not represented by the convergence of their perspectives, just as much as that of horizontal lines. It is, just as much. For it is only those horizontal lines which are inclined to the picture whose perspectives are drawn to a vanishing point. The perspectives of horizontal lines parallel to the picture are drawn parallel to themselves, just as those of the vertical lines are. And when the axis is inclined so that the plane of the picture is no

longer vertical, and vertical lines are no longer parallel to it, they, too, are drawn converging, one of their vanishing points, either the zenith or the nadir, being now behind the picture, and its perspective at a finite distance upon it.

26. Moreover, although lines parallel to the picture, whether vertical, horizontal, or inclined, do seem to converge towards a distant vanishing point just as other lines do, it is not necessary to represent this convergence, since their perspective representations in the plane of the picture also seem to converge as they recede from the eye, and in the same degree, covering and coinciding with them. The perspectives of the lines are themselves foreshortened, and the space between them diminished by distance.

27. To obtain this effect, however, in due degrees, as, indeed, to obtain the just value of all other perspective effects, the eye of the spectator must remain at the station point. From other points the picture necessarily looks inexact or distorted. These distortions increase from the center outward; and since it is so inconvenient as to be practically impossible to keep the eye always at the station point, it is best, in order to keep this distortion within reasonable bounds, not to extend the picture more than 60 degrees, that is, not to make it much wider than its distance from the eye.

Some other phenomena relating to perspective drawings are represented in Figure 2.

In this figure, though a variety of objects are indicated, only one direction of each kind is employed. All the right-hand horizontal lines belong to a single system, and all the left-hand lines to another. This, of course, would not happen to this extent in nature; but we have imagined, for simplicity's sake, that in the scene represented all the buildings are parallel, and that all the roofs are of the same pitch.

The center of picture, V^c, the point nearest the eye and opposite the station point, S, is here not exactly in the middle of the picture, but considerably to the right, being just below the church on the hill. The station point is about six inches from the paper; and the eye must of course occupy this position in order to make the things represented appear of their proper shape and size.

28. In this plate the following notation is adopted, a notation that will be adhered to throughout this treatise, and with which the reader should make himself perfectly familiar. Each direction is indicated by a single letter, the direction of each system of planes by two letters, which give the direction of two elements of the system; each vanishing point by the letter V, with the letter denoting the direction of the lines to which it belongs written after it; and the horizon of each set of planes by the letter H, and the letters denoting the plane.

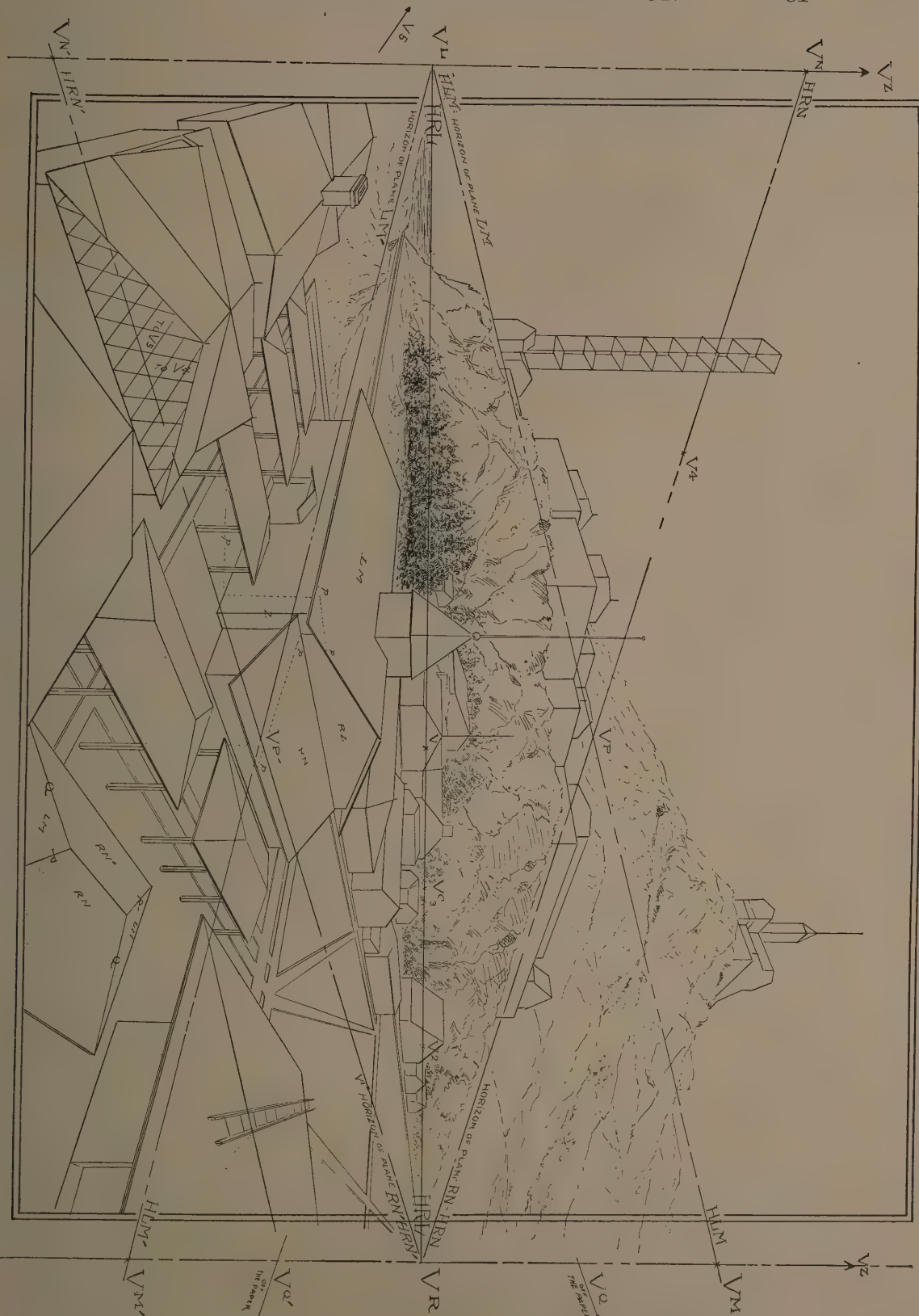


Figure 2.—Vanishing Points and Traces of Horizons.

LINES AND THEIR VANISHING POINTS

Lines	*Their direction*
C	Horizontal and normal.
Z	Vertical (to the zenith, or nadir).
R	Right-hand horizontal (*i.e.*, horizontal lines going off to the right).
L	Left-hand horizontal.
M	Right-hand, inclined upwards.
M′	" " downwards.
N	Left-hand, inclined upwards.
N′	" " downwards.
P, Q P′, Q′	Inclined lines formed by the intersection of inclined planes.

Their Vanishing Points

V^C	Vanishing point of normal lines, "the Center."
V^Z	" " vertical lines.
V^R	" " right hor. lines.
V^L	" " left " "
V^M	" " right incl. " up.
$V^{M'}$	" " " " " down.
V^N	" " left incl. " up.
$V^{N'}$	" " " " " down.
V^P, V^Q $V^{P'}$, $V^{Q'}$	" " lines of intersection.

The optical lines are lettered R^0, L^0, C^0, etc.—C^0 is the axis.

If there are several lines having the same general inclination, they may be distinguished by figures, as R^1, R^2, R^3, etc.

Special vanishing points may be indicated as V^1, V^2, V^3, etc.

PLANES AND THEIR VANISHING HORIZONS

Planes	*Their direction*
RZ	(Any plane of the system which contains, or is parallel to R and Z, i.e., right-handed vertical planes.)
LZ	to L and Z, i.e., left-hand vertical planes.
RL	to R and L, i.e., horizontal planes.
RN	to R and N, i.e., inclined up to the left.
RN′	to R and N′, inclined down to the left.
LM	to L and M, inclined up to the right.
LM′	to L and M′, inclined down to the right.

Their Vanishing Horizon

HRZ	horizon of the	right-hand	vertical	planes.	
HLZ	"	"	"	left-hand	vertical planes.
HRL	"	"	"	horizontal	planes (i.e., the horizon.)
HRN	"	"	"	planes	RN.
HRN′	"	"	"	"	RN′.
HLM	"	"	"	"	LM.
HLM′	"	"	"	"	LM′.

29. The position of the various vanishing points, as well as the dimensions of the various objects, are supposed to be obtained, in this picture, as they would be obtained in a sketch from nature, or from the imagination.

FINDING THE VANISHING POINT OF A SYSTEM OF LINES

If we place the eye at the station point and *look* in the direction followed by a system of lines, we shall see their vanishing point (8); and if the plane of the picture is interposed we shall see the perspective of the vanishing point in the same direction, covering the real vanishing point. Hence the perspective of the vanishing point of any system of lines is found by passing through the station point an element of that system. The point where it pierces the picture-plane is the perspective of the vanishing point of the system, coinciding with and covering the real vanishing point.

30. As M and M′ are equally inclined to the horizontal plane, one looks up towards V^M at exactly the same angle that he looks down towards $V^{M'}$. V^M is, accordingly, just as far above the Horizon as $V^{M'}$ is below it. The same is true of V^N and $V^{N'}$. But, although M and N make the same angle with the ground, the distance of their vanishing points above the Horizon is not the same. For the eye at S, six inches in front of V^C, is further from V^L than from V^R, L being less inclined to the plane of the picture than R is. Looking up, then, at the same angle, though the eye sees the real left-hand upper vanishing point at the same height as the right-hand one above the real Horizon, it sees its perspective V^N higher up on the paper.

TO FIND THE HORIZON OF A SYSTEM OF PLANES

31. In like manner, the perspective of the horizon of a plane, or of a system of planes, is found by passing through the station point an element of the system. The line where it intersects the plane of the picture is the perspective of the horizon of the system of planes. For, if the eye is at the station point, and glances along the element of the system passing through it, it will see the horizon upon the plane of the picture, covering and coinciding with the distant horizon. This line is the line where the plane passing through the eye cuts the plane of the picture.

32. And as the horizon of a system of planes passes through the vanishing points of all the lines that lie in it or are parallel to it, so does the perspective of the horizon pass through the perspective of their vanishing points; and as all lines lying in or parallel to the system have their vanishing points in this horizon, so do the perspectives of all such lines have their convergence or vanishing point in its perspective.

33. The propositions I, II, and III (13) are thus as true for the perspectives in the plane of the picture as for the real lines, auxiliary lines, vanishing points and horizons, and are exemplified over and over again in this plate. All the horizons shown pass through several vanishing points, and every vanishing point lies in the horizon of some system of planes. Every line which lies in two planes, as most of these planes do, has its vanishing point in both horizons, that is, at their intersection; and the horizons of all the planes parallel to any one of these lines intersect each other at its vanishing point.

34. It is specially to be noted that the lines of the hips and valleys lying at the intersection of two planes of the roofs have their vanishing points at the intersection of the horizons of these planes. Thus the lines P, P′, Q and Q′, being at the intersections respectively of RN and LM, RN′ and LM′, RN and LM′, and RN′ and LM, we have:

V^P at the intersection of HRM and HLM.
$V^{P'}$ " " " " HRN′ " HLM′.
V^Q " " " " HRN " HLM′.
$V^{Q'}$ " " " " HRN′ " HLM.

V^Q, the vanishing point of Q, is off the paper, being at the intersection of the horizons HRN and HLM′; and so, in like manner, is that of Q′ at the intersection of HRN′ and HLM.

On most of the roofs the planes LM′ and RN′, being on the further side, are out of sight. But the roof in the extreme foreground shows all four slopes. It has, accordingly, been selected for lettering.

35. This plate shows also that if the picture is vertical, the horizon of a vertical plane such as LZ or RZ, is a vertical line. For it must pass through the vanishing point, V^Z of the vertical lines that lie in it, and this point is the infinitely distant zenith.

Besides, it is the line in which that plane of the system which passes through the eye intersects the plane of the picture (31); and as both these planes are vertical, their intersection must be vertical.

36. Hence the hips and valleys P and P′ which lie in parallel vertical planes, and accordingly have their vanishing points V^P and $V^{P'}$ in the horizon of the system to which those planes belong, lie in a vertical line, one exactly above the other. As P and P′ are equally inclined to the horizontal plane, V^P and $V^{P'}$ as well as

V^M and $V^{M'}$, or V^N and $V^{N'}$, are equally distant from the Horizon. These relations are, indeed, sufficiently obvious from the symmetry of the figure.

The vertical horizon HPP′ is not shown in the plate.

37. The proposition that all lines lying in a plane have their vanishing points somewhere in the horizon of that plane, receives special illustration in the case of the paths which cross the flat open space beyond the railroad; being level, they have their vanishing points on the horizon, one at V^R, others at V_3 and V. The vanishing point of its sides, which are supposed to be made parallel, is at V^1 in the horizon of the plane of the roof. HRN′ refers to the ladder lying on the roof.

This proposition is very serviceable in putting in any parallel lines of any plane, as, for instance, in drawing the diagonal lines of slating on the roof to the left, the vanishing points being shown at V_4 and V_5 in the horizon of RN, the plane of the roof.

LINES PARALLEL TO THE PICTURE, PARALLEL TO THE HORIZON OF THE PLANES THEY LIE IN

38. But if a line lying in a given plane is parallel to the plane of the picture, then its vanishing point, though still in the horizon of the plane, will be at an infinite distance; and the line itself, being still directed to its vanishing point, will be parallel to the horizon. For lines which meet only at an infinite distance are parallel. Hence we have the general proposition that, in any plane, a line which is parallel to the picture will be drawn parallel to the horizon of the plane.

SECTIONS TAKEN PARALLEL TO THE PICTURE

39. In the figure the broken line ppp is drawn parallel to the plane of the picture. It is the line of intersection of a vertical plane parallel to the picture, cutting across the front corner of the principal building. In each plane it is parallel to the horizon of that plane.

40. That this must be so follows not only from 38, but also from the general proposition that if one system of parallel planes intersects another system, their lines of intersection are all parallel. For a line lying in any plane, and parallel to the plane of the picture, may be regarded as the intersection of that plane by a plane parallel to the picture.

But the horizon of the system of planes in which the line lies is the line in which a plane parallel to those planes and passing through the eye intersects the plane of the picture. We have thus two inclined planes parallel to each other. Their intersections are accordingly parallel, and the line in question is parallel to the horizon of the inclined plane in which it lies; and since it is parallel to the picture, its perspective is parallel to itself and also parallel to the horizon: Q. E. D.

INTERSECTION OF ANY PLANE WITH THE PLANE OF THE PICTURE

41. Moreover, if any plane of *that* system of planes is extended so as to cut the plane of the picture, *that* intersection is also parallel to the others, and to the horizon in question.

PLANES VISIBLE ONLY WHEN BELOW THEIR HORIZONS

42. This plate also illustrates the proposition (12) that in case of solid objects the plane surfaces by which they are bounded are visible only on the sides turned towards their horizons (12); they are visible only when they are, so to speak, *below* their horizons.

We see in the plate that the roof most nearly below the eye, being below all the horizons, shows all its slopes, and so does the next one to the left. In all the others, one, two, or three planes disappear, as they are above their horizons, until at last, in the case of the church on the top of the hill, which is above all the horizons, all the roofs are out of sight.

One of the houses in the fort on the lower hill shows the roof LM just disappearing, the lines L and M both coinciding with the horizon HLM.

It is to be observed that these horizons, being portions of great circles, do not terminate at the vanishing points by which their position is determined, but pass through and beyond them.

43. The perspective of a line or of a point is often called a perspective line or point, or when speaking of the picture, simply a line or point. But in this last case, to avoid confusion of mind, one must be careful to notice whether the real line or point and the infinitely distant vanishing point are spoken of, or their representations in the plane of the picture.

So when one is speaking of the horizon of a system of planes, he must be careful to notice whether the infinitely distant line, or the line in the picture which covers, and to the eye coincides with it, is intended.

XVII

PERSPECTIVE—SECTION 3

SKETCHING IN PERSPECTIVE—THE PERSPECTIVE PLAN, THE DIVISION OF LINES BY DIAGONALS

Having in the first section considered the nature of the phenomena with which perspective drawings have to do, we examined in the last section the aspect of the drawings themselves, first observing the relation which lines parallel to the plane of the picture bear to their perspective representations, and then, in the case of those not parallel to the plane of the picture, the relation

that the perspective lines and planes by which the objects represented are defined bear to the perspective of *their* vanishing points and horizons. Figures 3, 4, 5, 6, 7, 8 and 9.

These figures illustrate almost all the points raised in explaining Figures 1 and 2, the roofs that are below their horizons being all visible, and those that are above them being all out of

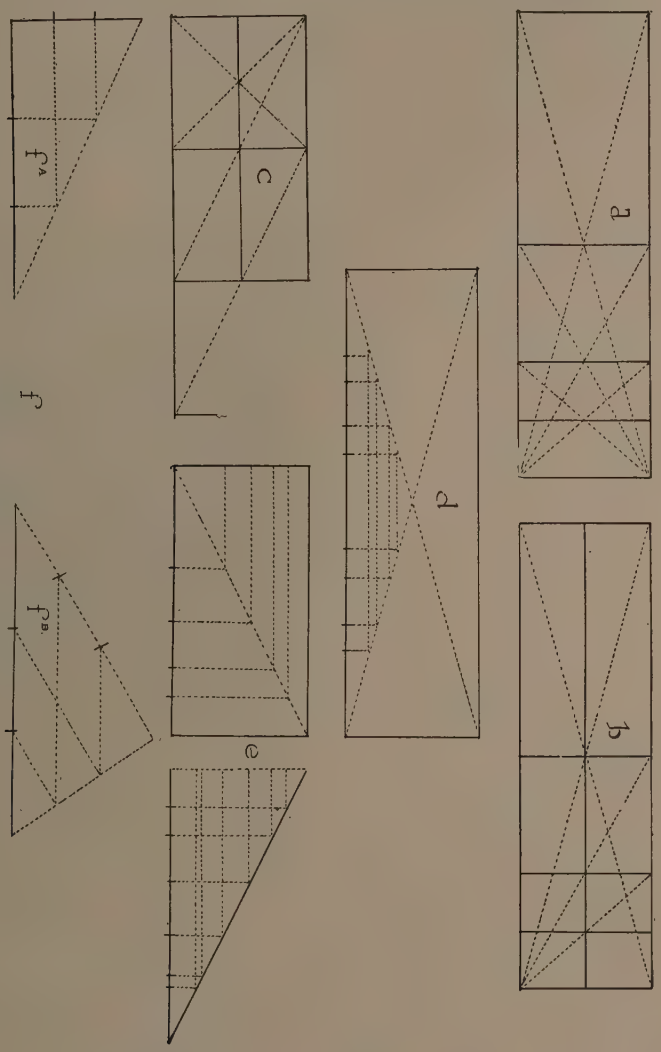


Figure 3.—Use of Diagonals.

sight, while all the lines of intersection of the planes converge to the intersection of their horizons. This is specially noticeable of the valleys of the main roof in the lower picture.

The horizon HPP′ of the system of vertical planes PP to which these valleys are parallel, and which accordingly passes through their vanishing points (13 II), and which was not drawn in the previous plate, is here shown.

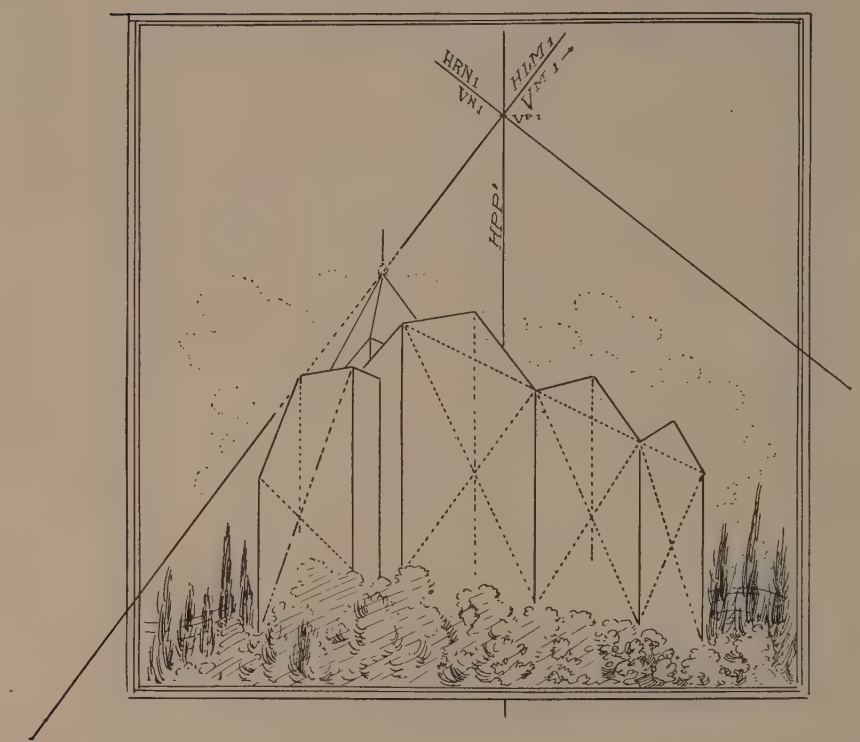


Figure 4.—Toad's-eye View. (Use same Ground Plan as in Figures 5, 6, 7, 8 and 9, also same Horizon and Vanishing Points V^L and V^R.

Figure 5.—Toad's-eye View. (Use same Horizon and Vanishing Points V^L and V^R and the same Ground Plan as in Figure 8.)

Since the lines which indicate the position of these valleys in the perspective plan lie in the same vertical planes with the valleys themselves, they must have their vanishing point in this same vertical horizon HPP′; and since, like all the lines of this plan, they lie in the Horizon (13, I), it is therefore to be sought at the intersection of HPP′ with the horizon, at the point marked V^X (13, III). Since the vertical planes in which these valleys lie are obviously at an angle of 45° with the principal vertical planes RZ and LZ, this line X, whose vanishing point is at V^X, is at 45° with the lines R and L. V^R is off the paper.

44. If we put eye at the station point S, four or five inches in front of V^C, and, looking first at V^R and V^L in directions at right angles to each other, look then between them so as to exactly divide the angle, we shall be looking in the direction X and shall see V^X directly in front of the eye (6).

We will retain this notation, V^X, throughout this treatise, to denote the vanishing point of horizontal lines, making an angle of 45°.

The little building on the left has steeper roofs than the other, their slope being the same as that of the roof of the tower. Their vanishing points are accordingly V^{N1}, V^{M1}, $V^{N1'}$, etc., which are off the paper.

As the tower roof is supposed to slope alike all round, the hips P_1 and P_1' lie also in parallel planes, at 45°; their projection on the perspective plan has V^X for its vanishing point, and V^{P1} and $V^{P1'}$ lie in the horizon of the plane PP′, at equal distances above and below the Horizon (36).

45. The position of these vanishing points and horizons is supposed to be determined just as the position of the other leading points in the picture is determined; that is to say, their relative position on the paper is made to correspond to the relative position of the real points and vanishing points, as nearly as may be, by the eye, by looking first at the point and then looking for the corresponding place on the paper. The position of the leading vanishing points being thus determined, the horizons can now be drawn connecting them, and new vanishing points, such as V^P and $V^{P'}$, determined by their intersection.

SKETCHING

If the propositions illustrated in the last section are borne in mind, a consistent and tolerably correct *perspective sketch* can easily be made, the eye being greatly aided in its estimate of the relations of things and their apparent shape and dimensions by the considerations to which attention is thus directed. The principal points being fixed by the eye, the other points are then determined, partly by the eye, partly by means of lines drawn to the vanishing points.

THE PERSPECTIVE PLAN

46. A great advantage may also be found in the use of a *perspective plan* of any object that is to be drawn, especially in sketching, not from objects but from the imagination. Thus in the figure (Figure 9), although the main building could be drawn without much chance of error, it is by no means so easy to determine just where the tower behind it should make its appearance over the roof. By completing the plan, however, as is done by dotted lines, its position is at once determined.

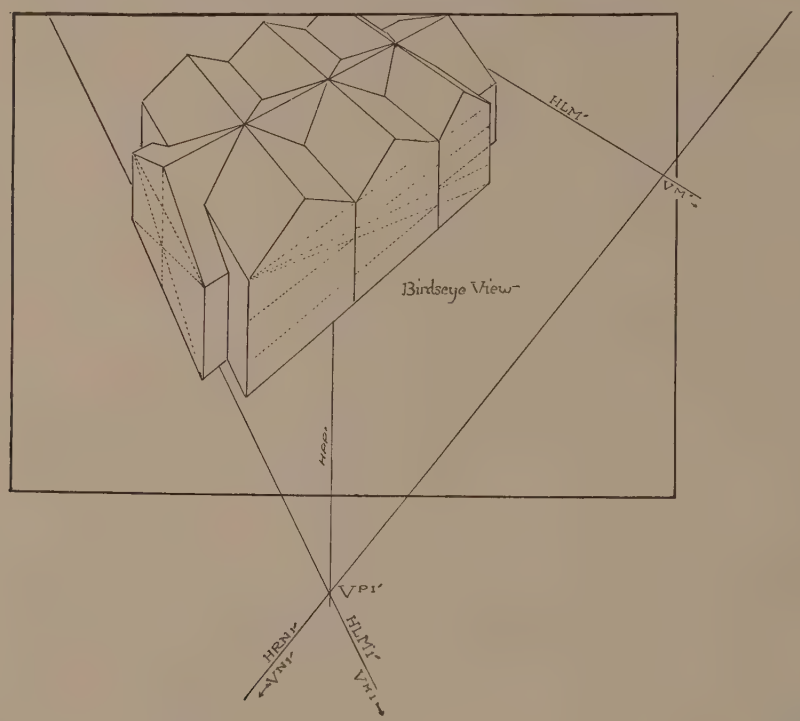


Figure 6.—Use of Diagonals in the Perspective Plan. (Use same Ground Plan and Original Horizon Line and Vanishing Points V^L and V^R as in Figure 9.)

The objection that it is undesirable to cover the drawing with construction lines may be entirely met by drawing the plan at a lower level, as if it were the plan of the bottom of the cellar, ten or twenty feet underground; and for the purpose in hand the cellar may be supposed to be of any conventional depth so as to get the plan entirely out of the picture, as is done in the figure.

47. This sinking of the perspective plan has two incidental advantages. In the first place it makes it practicable to draw it on a separate piece of paper, which may be removed and kept for use a second time. In the second place, it defines the position of things much more accurately; the lines by whose intersection

the position of the vertical lines is determined, cutting each other more nearly at right angles. It will be seen in the figure that the lines in the real floor plan cut each other so obliquely that it is not easy to tell exactly where the corners of the tower do come.

BIRD'S-EYE VIEWS

48. It follows from this that the level at which the object is to be shown in perspective is quite independent of the level chosen

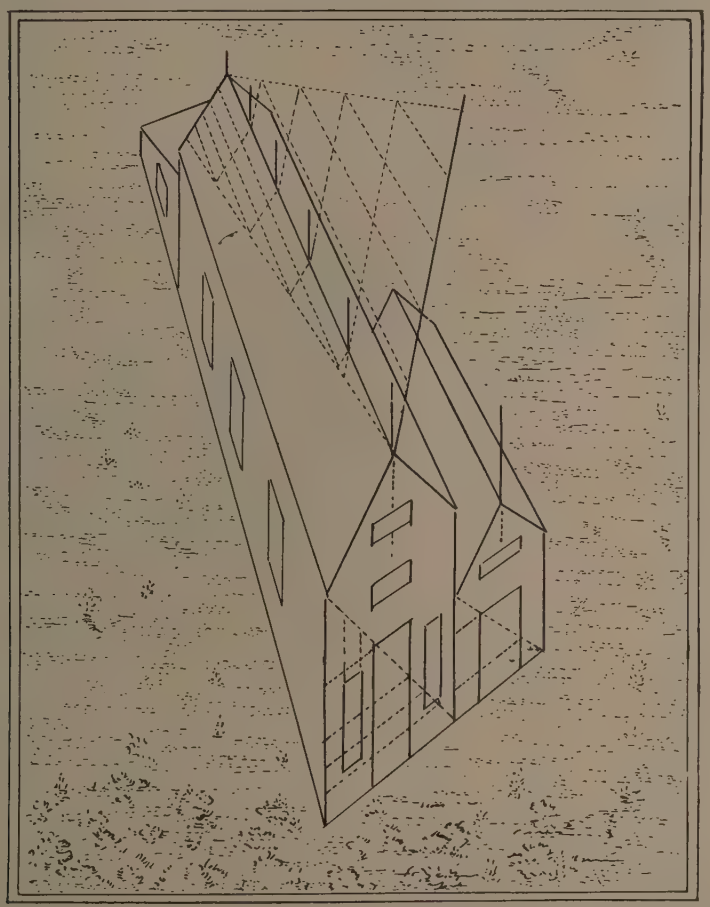


Figure 7.—Bird's-eye View. (Use same Ground Plan as in Figure 8 and same Horizon and Vanishing Points V^L and V^R.)

for its plan. This is also illustrated in Figures 3-9, the same plan serving for three representations of the building, at different levels,—one nearly even with the eye, with a bird's-eye view below, and with what might be called a toad's-eye view of it above. The same vanishing points being employed in all three sketches, the phenomena pointed out in the previous section, of the appearance and disappearance of plane surfaces according as they come below or above their horizons, are here again illustrated.

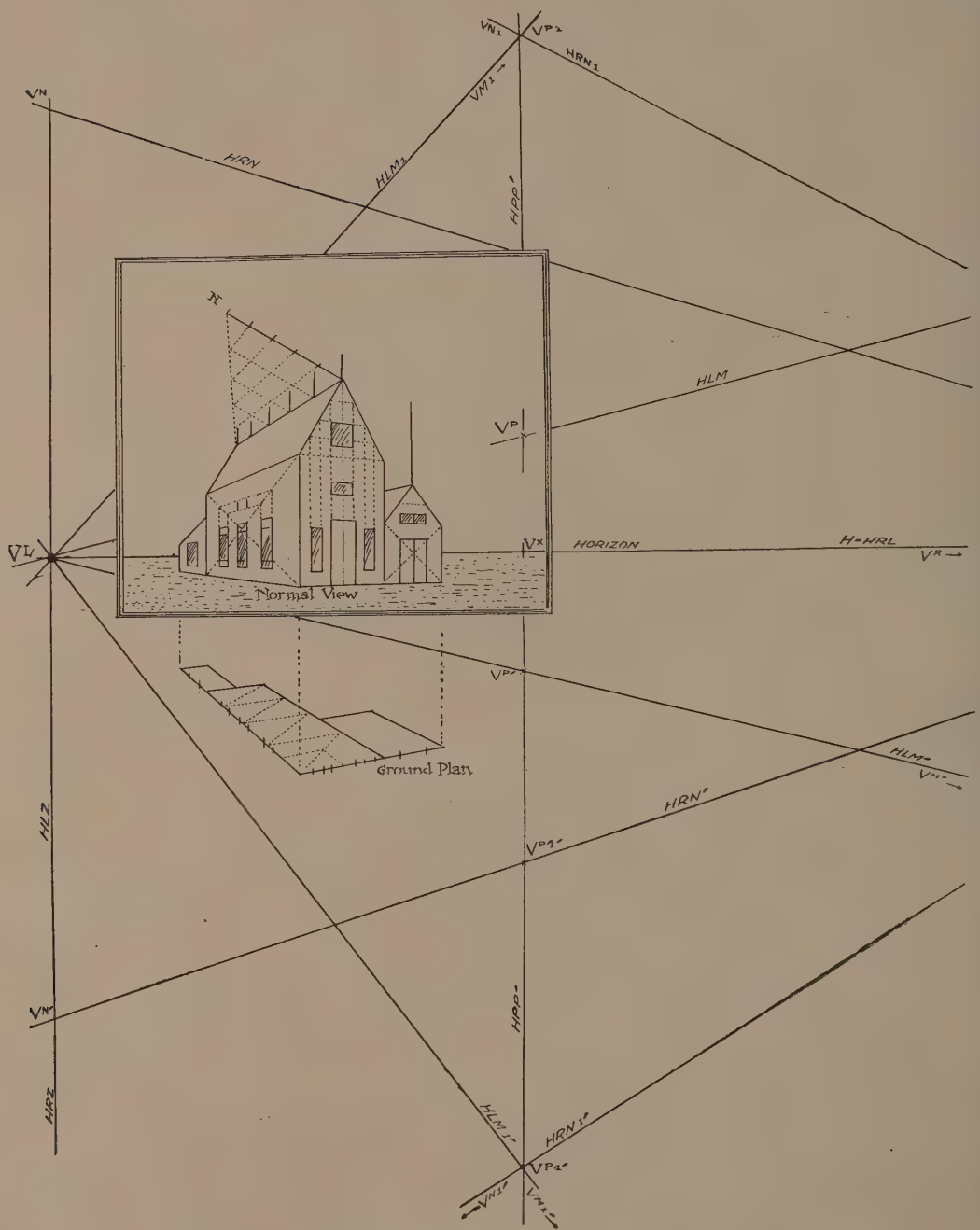


Figure 8.—Use of Diagonals in Perspective.

49. In thus sketching from nature, in perspective,—that is, from the real object,—or from imagination, it will be found much easier to determine vertical magnitudes than horizontal ones; that is to say, it is easier to determine the position of horizontal lines, *but not* their length; and the length of vertical lines, but not their position.

In the sketch, for example, the position of the vanishing points and the position and height of the front corner of the building to be represented being once assumed or determined, other heights, whether equal or different, can easily be determined by means of parallel lines drawn to the vanishing points. The height of an object having been assumed in one part of the picture, an object of the same height can be put in anywhere else by the employment of parallel lines. But though it is easy to thus represent the three gable-ends in this sketch as being of the same height, it is not so obvious how to draw them so that they shall all seem equally wide.

50. Moreover, the subdivision of the perspective of vertical lines, whether into equal parts or according to some given proportion, presents no difficulty; for the vertical lines are parallel to the picture, and their perspectives will accordingly be divided just as the lines themselves are (20).

THE DIVISION OF LINES

But while the division of vertical lines and their apparent diminution in size is easily managed, the subdivision of horizontal and inclined planes (except those which, like the vertical, are parallel to the plane of the picture) is a matter of difficulty. The more remote divisions are smaller, but it is not clear *how much smaller.*

Two methods are adopted to determine this,—the method of *diagonals,* and the method of *triangles.* Let us take the first:—

The method of *diagonals* is illustrated in the various figures shown. It applies to parallelograms, whose perspectives are given or assumed, the following propositions:—

HALVING, QUARTERING, ETC.

51. *Proposition 1.* A line drawn through the intersections of the diagonals of a parallelogram parallel to two of its sides, bisects the other sides and the parallelogram itself. See *a,* Figure 3.

This process may be repeated with each half, and the given figure, or any line in it, divided into 2, 4, 8, 16, or 32 equal parts, etc. See *a,* Figure 3.

The application of this to the perspective of a parallelogram is shown in Figure 9, where the left-hand side of the building is thus divided.

52. Less familiar is the employment of this principle to ascertain the vertical axis of a tower, two of whose sides are given in

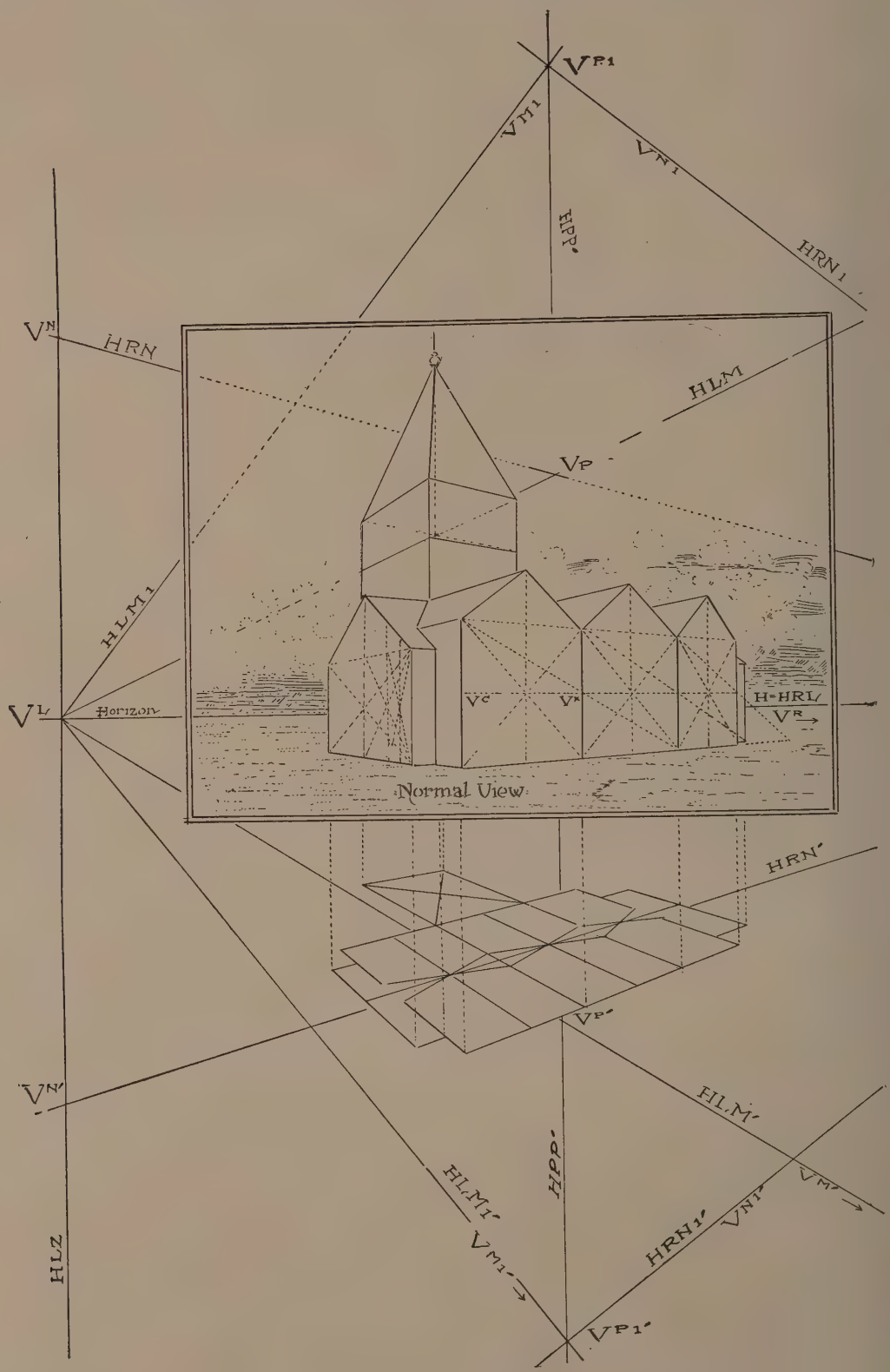


Figure 9.—The Perspective Plan, Use of Diagonals.

perspective, as in Fig. 9. If diagonals are drawn across the tower from two points on the right-hand vertical corner to points at the same levels on the left-hand corner, they will intersect in the middle of the tower, and a vertical line through their intersection may be used to determine the apex of the roof which covers it, as in the figure. These diagonals lie in a vertical plane that crosses the tower diagonally.

53. This is the common way of dividing a perspective line or surface into *halves;* and it is constantly used, as on the left-hand side of this building, and on the right-hand side of the building above (Fig. 4), to determine the center line of a gable and the position of its apex. Fig. 4.

54. It is obvious that this furnishes the alternative method of determining the slope of these roofs. Instead, that is, of fixing the position of the vanishing points of M and M′, P and P′, and thus obtaining the direction of these inclined lines, we may assume at once the direction of any one of these lines, say the nearest one. The intersection of this line with the central vertical line fixes the height of the roof; the other slope and the other roofs are then easily drawn.

55. Perspective is full of these alternative methods, different ways of doing the same thing. Which way it is best to adopt in any given case depends upon the nature of the case. In the present instance, the vanishing points V^{M} and $V^{M'}$ being outside the picture, the method of diagonals is rather the most convenient.

56. It is to be observed, however, that though V^{M1} are off the paper, V^{P} and V^{P1} are within easy reach. It is generally worth while, accordingly, to fix the position of the more remote vanishing points so as to determine the position of the horizons that lie between, and of the points where those horizons intersect, even if we make no direct use of the vanishing points themselves.

Thus, in the plate, although the points V^{M1}, V^{N1}, $V^{M1'}$, and $V^{N1'}$, which give the slope of the roofs of the small house and of the tower, are all at a distance, the horizons of the planes of the roofs HRN_1, HLM_1, HRN_1' all cross the paper, and their intersections V^{P1} and $V^{P1'}$ are close at hand.

57. *Proposition 2.* If, through the intersection of diagonals, a second line is drawn parallel to the other two sides of the parallelogram, a single diagonal suffices to effect the subsequent subdivisions, as is exemplified in *b,* Figure 3, and on the left-hand side of the larger building in Figure 6.

DOUBLING, TRIPLING, ETC.

58. *Proposition 3.* Conversely, if a line drawn from one corner of a parallelogram to the middle of one of the opposite sides be continued until it meets the other side, prolonged, the length of that side, or of the parallelogram itself, may be doubled, and by a repetition of the process, tripled, quadrupled, etc. See *c,* Fig. 3.

This proposition is of great use in perspective drawings as may be seen in Fig. 9, where the gabled end on the right is several times repeated, each time smaller than before.

It will be seen that the gable ends of the roofs grow steeper and steeper, their lines converging, in fact, to the distant vanishing points M and M′. By obtaining these points, the accuracy of these results can be tested.

SYMMETRICAL DIVISION

59. *Proposition 4.* If one side of a parallelogram be divided in any way at one end, equal divisions may be laid off at the other end by means of two diagonals. See *d,* Fig. 3.

This is very useful in giving a symmetrical treatment to a surface shown in perspective, as is seen in the left-hand building, Fig. 9. The position and width of the nearer window on the side of the building being assumed, the vertical lines enclosing the further window are easily found. At the end of the building, the inclined lines of the gable, which may be regarded as the semi-diagonals of an unfinished parallelogram, answer the same purpose. The base of any isosceles triangle can be divided in this way.

PROPORTIONAL DIVISION

60. *Proposition 5.* If one side of a parallelogram be divided in any way, the adjacent sides may be similarly divided into proportional parts by means of one diagonal; and by using the other diagonals the order of the parts may be reversed. See *e,* Fig. 3.

By this means any required division of a line given in perspective may be effected, as is shown in Figures 4 and 6, on the right-hand sides of both buildings. The required division is made on the vertical line and then transferred to the horizontal line by means of the diagonal, the nearest corner of the small house being divided according to the desired position of the door and windows, and that of the large building into three equal parts.

61. If the diagonal makes an angle of 45° with the adjacent sides, their segments will, of course, be not only proportional but equal, each to each.

In the perspective plan of the small building, for example, in which the diagonals are directed to V^x, the "vanishing point of 45°," and accordingly make an angle of 45° with the sides of the building, it appears that the window is just as far from the corner on one side as the farther edge of the door is on the other. It appears also that the plan of this building is just four squares, though it hardly looks so, the side being greatly foreshortened while the main part of the other building is just as broad as it is long, comprising nine squares, each as large in plan as the tower.

62. In applying this proposition to a perspective drawing, the line on which these parts are first laid off must, of course, be a vertical line or some other line parallel to the plane of the picture,

as it is only in the case of such lines that the division of the perspectives is proportional to that of the lines themselves. (20.)

63. *Proposition 6.* It is not necessary that the length of this line shall be previously determined. Indeed, it is more convenient that it should not be, as it is easier to establish a given ratio of parts on an indefinite line. The equal or proportionate parts may be set off at any convenient scale on any convenient line that touches the end of the line to be divided, and the diagonal drawn without completing the parallelogram as in *f,* Figure 3.

The division of the long wall in Fig. 6, for instance, is effected by setting off three equal distances upon the further corner, just as well as by dividing the near corner into three equal parts.

64. It is not necessary in any of these cases, of course, that the parallelogram shall be a rectangle. The inclined line N, for example, in the middle of the upper figure, Fig. 8, is divided into five equal parts by equal divisions laid off on the vertical line that bisects the gable.

In these last propositions, it will be observed, use has been made of only half a parallelogram; that is to say, of a triangle.

65. Proposition 5 may then be restated as follows: If one side of a triangle be divided in any way, the adjacent side may be divided into proportional parts by means of lines drawn parallel to these two sides and meeting on the third side. See f, Fig. 3.

66. And from Proposition 6 we may derive this: If from one end of a line there be set an *"auxiliary,"* parallel to the picture-plane, any parts taken upon the perspective of this auxiliary may be transferred to the perspective of the line in their true proportions by means of a third line joining the last point taken on the auxiliary with the other end of the first line (65).

67. But as any line, drawn in the picture at random, may be conceived of as being the perspective of a line which it exactly covers and conceals, drawn parallel to the picture, it follows that *any line whatever* touching one end of a perspective line may be used as an auxiliary by which to divide *it* in any required proportion; and, the triangle being completed, the first segments of the broken lines by which the proportions are transferred will be parallel to the line to be divided and will be directed to its vanishing point, and the second segments will be actually parallel to the auxiliary line, since its vanishing point is at an infinite distance.

Thus, if it is required to erect six equidistant spikes upon the ridge of the left-hand building, we may from either end of the ridge draw a line in any convenient direction, and lay off on that line five equal parts, using any convenient scale, as in the figure. Completing the triangle and proceeding as above, we get the points of division desired. This triangle does not lie in a vertical plane, but in an oblique plane containing both the horizontal line to be divided and the auxiliary line; this line is parallel to the picture and is shown in its true direction, Fig. 7, Fig. 8.

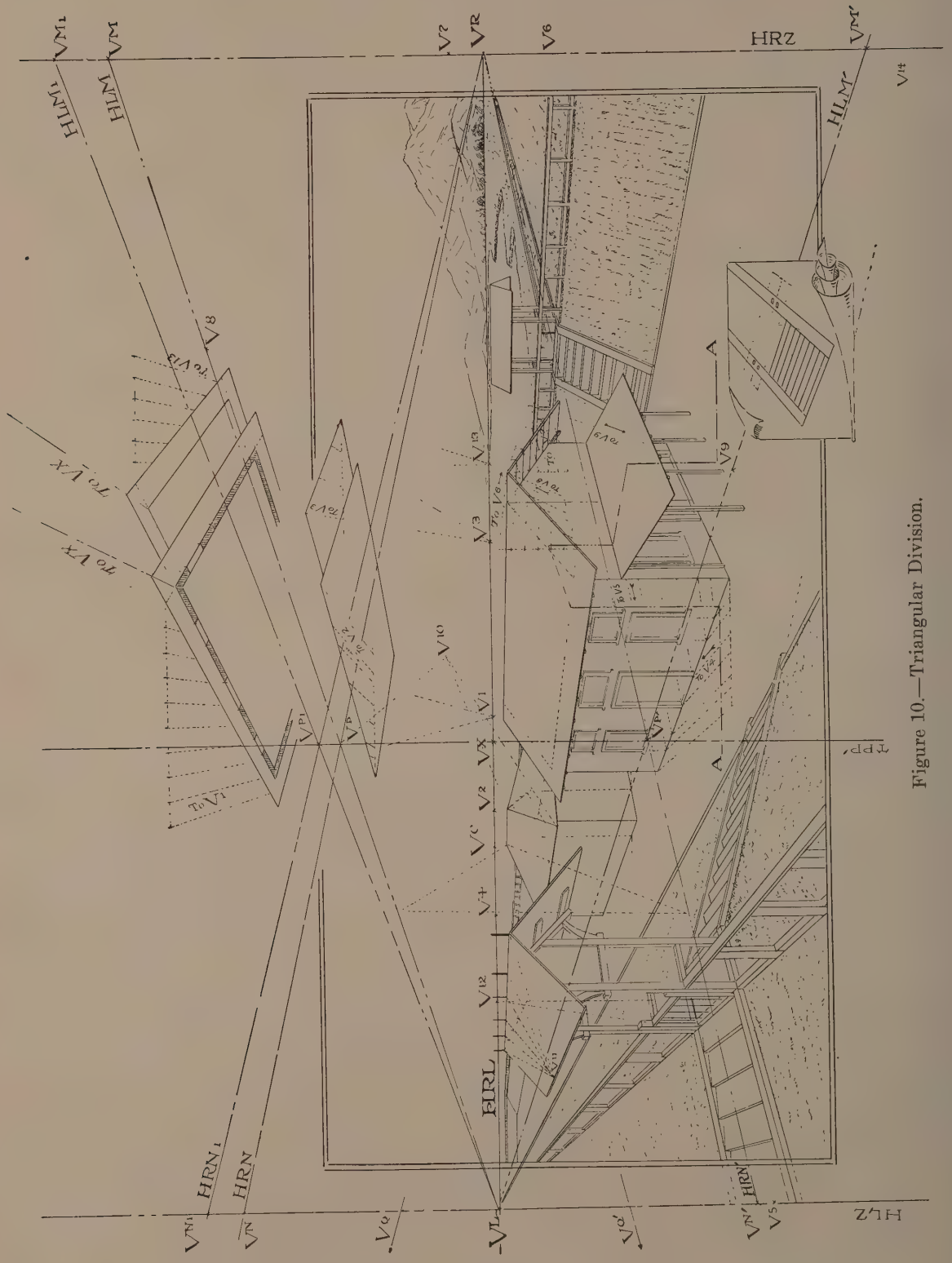


Figure 10.—Triangular Division.

Finally, since any line whatever that touches the end of the line to be divided will serve this purpose, it is often convenient, instead of drawing a new line, to employ a line already existing.

We may, for example, as in Fig. 7, lay off our five equal parts on the sloping line of the further gable, and obtain the same points on the ridge as before. This line, however, is now conceived to represent, not the line of the gable, but a line parallel to the plane of the picture, so taken as exactly to cover the line of the gable so that their perspectives coincide.

XVIII

PERSPECTIVE—SECTION 4

THE DIVISION OF LINES BY THE METHOD OF TRIANGLES

The third section first set forth the convenience in making a perspective drawing, of putting into perspective the plan of the object to be drawn, and the sinking of this plan so far below the representation of the object as to get it free from the picture.

Figure 10 affords further illustration of the use of the *perspective plan.* The plan of the gate-house on the left is indeed below the picture, having been drawn on another piece of paper, and removed, as suggested in a previous paragraph (47). But the plan of the one in the distance on the right is given, and it serves to determine all the principal dimensions. The plan of the principal building, the *barn* in the valley, is drawn above it instead of below, as is sometimes most convenient, especially in high buildings, in the upper parts of which it is of advantage to have the perspective plan near at hand. It is often a convenience, also, to make several plans, set one above the other, taken at different levels. In the plate, for example, we have first the plan of the outlines of the walls to determine the position of the doors and windows, and of the posts of the shed, and then just above it the plan of the eaves, showing their projection and the position of the brackets beneath them. As only the front part of the building is seen, only the front part of the plan needs to be drawn. In putting in the eaves, advantage is taken of the "vanishing point of 45°," V^x, to make them equally wide on each side.

In this plate the slope of the roofs and gables of this building, as well as of the smaller one with a hipped roof beyond it, is indicated by the same letters as in the previous plates, and their vanishing points accordingly by V^M, $V^{M'}$, etc., as before. The gables of the little gate-houses are so steep that their vanishing points are quite out of reach; and these gables are, in fact, drawn by the method of diagonals, as described in the previous section

(54). The slope of the steps is given by V^{M1} and $V^{M1'}$, and the trace of the inclined planes of the bank of earth by HLM_1 and HLM_1'. Their position shows that the banks are a little steeper than the roof of the barn. The diagonal braces of the fence have nearly the same slope as the barn shed, converging to points just below V^N and just above $V^{N'}$.

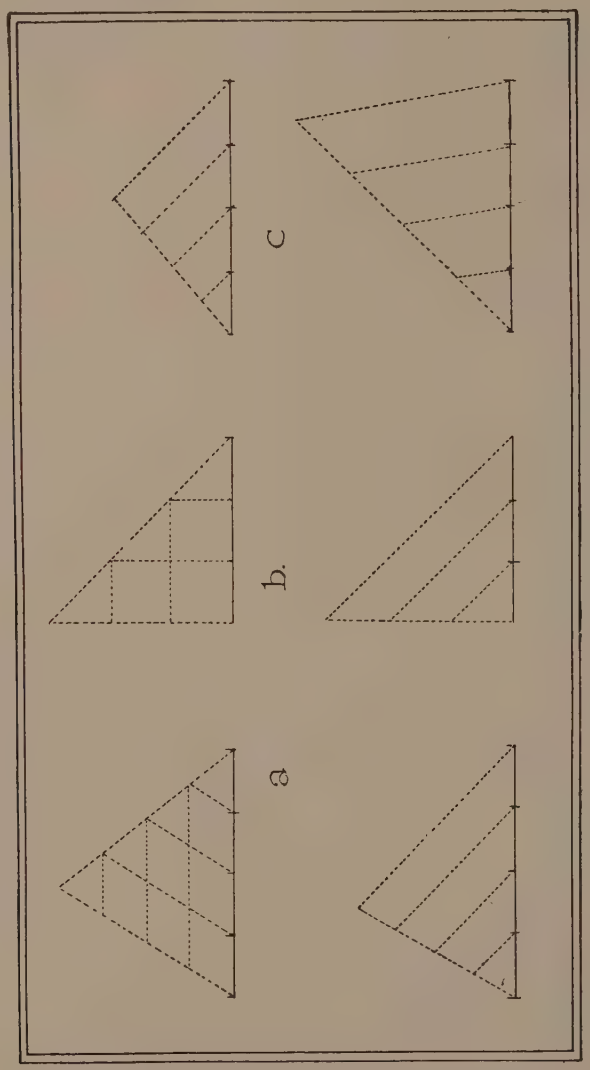


Figure 11.—Division by Triangles.

In this plate the center V^C is again quite out of the middle of the picture. The station point S, the proper position of the eye, is about six inches in front of V^C.

THE METHOD OF DIAGONALS

68. The first of the two methods by which a line given in perspective may be divided up in any given proportion has already

been described. It is shown that this, though called the *method of diagonals,* finally leads to the division of such a line by means of a triangle, one side of which is formed by the line to be divided, and one side by an auxiliary line drawn parallel to the plane of the picture in any convenient direction and divided in the given proportion.

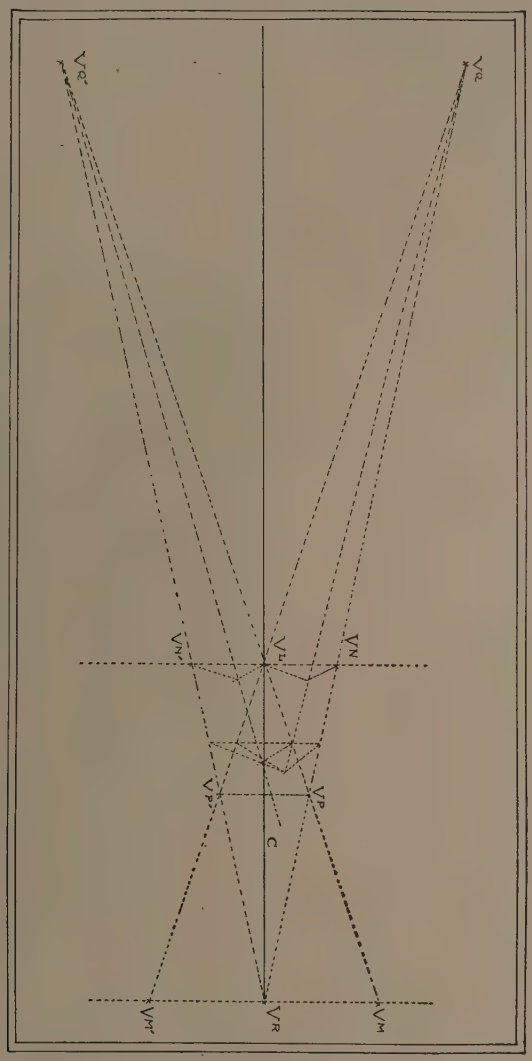


Figure 12.—Division by Triangles.

The *points of division* are transferred from this auxiliary line, first to the third line of the triangle by lines parallel to the perspective line and directed to its vanishing point; and then to the perspective line by lines actually parallel to the auxiliary.

69. Both these steps are obvious and simple applications of the proposition that lines drawn parallel to one side of a triangle divide the other two sides proportionally. But it does not yet appear what is the real direction of this *third side,* nor in what

plane the triangle really lies; that is to say, the vanishing point of this line and the horizon of this plane are not yet determined.

70. The other method of dividing perspective lines called, par excellence, the *method of triangles,* is a more direct application of the same principle. The auxiliary line, as before, is drawn parallel to the plane of the picture, but the points by which it is divided are now transferred directly to the perspective line by lines drawn parallel to the *third side* of the triangle. Figure 11 is devoted to the illustration of this method. In *a* and *b,* Figure 11 is shown the difference between this method and the preceding. In each of the triangles here shown the base is divided proportionally to the parts set off on the left-hand side. But in the upper ones the division is effected by the method of diagonals, as in *f,* Fig. 3; in the lower ones the same result is reached more directly and simply by the method of triangles.

71. This application of the principle in question, however, though more direct and simple, is in one respect less easy of adaptation to lines given in perspective. For the two systems of parallel lines employed in the method of diagonals may be drawn without difficulty, the first having the same vanishing point as the line to be divided, and the second being actually parallel to the auxiliary line, since that line is parallel to the picture-plane. But in the method of triangles, the lines by which the points are transferred are parallel to the third side of the triangle, whose vanishing point is not known. It is, accordingly, necessary first to find the vanishing point of this line.

POINT AND LINE OF PROPORTIONAL MEASURES

72. This may be done at once when, as in the plan of the eaves at the top of the plate, the plane in which the auxiliary triangle lies is known; that is to say, when its horizon has been already ascertained.

The auxiliary line here lies in the horizontal plane, and the given line lies in the same plane; the whole triangle is accordingly in the horizontal plane and all *its* lines have their vanishing points in the Horizon,—the given line at V^L, the auxiliary line at an infinite distance, and the third side of the triangle at V_1. This point is ascertained simply by prolonging this side until it reaches the Horizon (13). If now it is desired to find the position of the ten brackets that support the eaves, it is necessary to lay off on the auxiliary line nine equal divisions, and to complete the triangle by drawing lines parallel to the *third side,* the distances set off on the auxiliary are at once transferred to the perspective line, the lines converging to V_1.

This auxiliary vanishing point is called the vanishing point of proportional measures, or simply the *point* of *measures.* The auxiliary line is called the line of proportional measures, or simply the *line* of *measures.* These must not be confounded with the

point and line of *equal* measures described in the next section (98, 99).

73. It makes no difference, of course, at which end of the perspective line the line of proportional measures is drawn, so that it is parallel to the picture-plane. The relative position of the doors, windows, etc., in the lower plan, and of the posts of the shed, are laid off on lines of measures drawn from their further ends, and the points of division transferred to the lines of the plan by means of the points of measures V_2 and V_3, both of which, of course, are in the Horizon. But it is obviously conducive to precision to have the line of measures touch the nearer end of the line to be divided; since, in general, converging lines give more accurate results than do lines of divergence. Neither, of course, does the size of the proportional parts laid off upon the line of measures affect the result.

In *c*, Fig. 11, the base of the triangle is divided into the same four equal parts, whether the parts taken on the adjacent side are large or small. Any convenient scale may be used, but the scale will in general be found most convenient which makes the line of measures about as long as the perspective line to be divided, and which brings the point of measures within easy reach.

74. In the same way, a line lying in a vertical plane may be divided by means of a vertical line of measures; the point of measures or vanishing point of the third side of the triangle and of the lines drawn parallel to it being now in the horizon of the vertical plane. If a line lies at the intersection of two planes, it is a mere matter of convenience whether the line of measures is taken in one plane or the other, or in which horizon the point of measures is taken.

Thus the seven parts into which the length of the barn in Figure 10 is divided may be taken either on a horizontal or on a vertical line; that is to say, upon a line of measures parallel to the horizon of either plane. The points at the bottom of the wall, on the left-hand side, which determine the position of the doors and windows, may be got either by means of a horizontal line of measures, as shown, with its point of measures on the Horizon of V_4, or by a vertical line of measures, namely, the corner of the barn, on which the same proportional parts are laid off, with its point of measures on the horizon of the plane LZ at V_5. Here the first triangle lies in the horizontal plane, and the second in the vertical plane, the first on the ground and the second in the side of the barn, as they seem to.

75. If a line lies in a plane inclined to the horizontal plane, as each inclined line of the gable-ends of the barn lies in the plane of its roof, a similar procedure may be followed. A line of measures may be taken in that plane, touching the given line at one end and parallel to the picture,—the point of measures being now in the horizon of the plane of the roof.

76. And, as in the horizontal plane, a line parallel to the picture is horizontal, and in vertical planes, vertical, that is to say, in each case, parallel to the horizon of the plane it lies in—so, in the case of an *inclined plane,* a line lying in it parallel to the picture, is parallel to the horizon of the system to which the plane belongs; for though its vanishing point is somewhere in that horizon (13), it is at an infinite distance (20). A line directed to that point is, accordingly, parallel to the horizon.

77. The perspective of an *inclined line* can then be divided in any required proportion, as easily as that of a horizontal or vertical one, by drawing through one end of its line of proportional measures parallel to the horizon of the inclined plane in which it lies, and taking the point of measures on that horizon.

Thus, in the plate, the position of the brackets or purlins on the gable of the barn is found by dividing each slope into six parts, by means of a line of measures drawn parallel to HLM, the horizon of the roof in question; and as the sloping lines of the gable lie in a vertical plane RZ, parallel to the side of the barn, as well as in the plane of the roof, it follows that the position of the six brackets can be found either by laying off equal parts, or vertical lines, with points of measures on the horizon of RZ, at V_6 and V_7, or by laying off equal parts upon lines of measures parallel to the horizons of the planes of the roofs, that is to say, parallel to HLM for the left-hand slope, and to HLM′ for the other, with points of proportional measures at V_8, in HLM, and V_9, in HLM′, respectively. In the former case the triangles lie in the plane of the gable-end; in the latter, each lies in the plane of its own roof.

SECTIONS PARALLEL TO THE PICTURE

78. It follows from the above, as has already been shown, that if any object bounded by plane surfaces be cut through by a plane parallel to the plane of the picture, the line of intersection on each face will be parallel to the horizon of the plane in which it lies (39). This is exemplified in the plate, where the dotted line, AA, running along the ground and over the barn, follows this law. If the front corner of the building were sliced off parallel to the picture, this would be the line of the cut. The same thing is exemplified on the front corner of the other building.

79. Finally, just as in the method of diagonals we found at last that the auxiliary line, or line of measures, may be taken in any direction, at random, so here the same thing is true. For here, too, any line, drawn in any direction at random, from either end of a perspective line, may be regarded as the perspective of a line of measures, parallel to the picture, and drawn parallel to the horizon of the plane in which it lies. This horizon, then, will be parallel to it; and since the plane contains the perspective line, its horizon must pass through the vanishing point of that line; for the horizon of a plane passes through the vanishing points of

all the lines that lie in it (13); if then through the vanishing point of the line we wish to divide we draw a line parallel to the *assumed line* of *measures,* we shall have the horizon of a plane in which they both lie; and upon this horizon the third line of the triangle (joining the other end of the perspective line with the *last point* taken on the line of proportional measures) will have its vanishing point. This point, the point of measures, can be found, just as before, by prolonging the third line, the base of the triangle, till it touches it.

80. The principle that the line of measures may be taken and drawn at random in any direction, the corresponding point of measures being taken on a line or horizon drawn parallel to it through the vanishing point of the line to be divided, is illustrated in the division into five equal parts of the hip of the roof of the smaller building in the middle distance.

Here the line of measures is drawn arbitrarily at about 60°, the auxiliary horizon being drawn through V^P, the vanishing point of the hip, and its point of measures, V_{10}, determined on that horizon. The triangle here seems to lie in the plane of the roof, but in fact it has nothing to do with it.

81. Moreover, since the only characteristic of this auxiliary horizon, relatively to the conditions of the problem, is this, that it passes through the vanishing point of the line to be divided, it follows that any line drawn through the vanishing point of a given line, may be regarded as the horizon of a plane in which the given line lies, and will contain the point of measures drawn through either end of the given line, parallel to it.

82. This gives us, in other words, this singular proposition:—

Of any two perspective lines having the same vanishing point, one may be taken as the horizon of a plane passing through the other; and if a third line be drawn parallel to the first, and touching one end of the second, any *parts* taken upon this third line may be transferred to the second in their true proportions, by means of a point of measures taken upon the first.

83. The position of the vertical bars of cresting upon the ridge of the gate-house on the left, is determined in this way, five equal parts being laid off upon a line drawn from the further end of the ridge parallel to the eaves of the roof, as a line of measures, and the point of measures, V_{11}, taken on the eaves.

The way in which the position of the vertical bars of the gate below is determined, also illustrates this proposition. A line touching the top of the gate is drawn parallel to the ridge-pole, which has the same vanishing point, V^L. Equidistant points are taken on this line, and transferred to the top of the gate by a point of measures, V_{12}, taken on the ridge-pole. This reduces the labor of dividing up a given perspective line in any required proportion, to almost nothing.

84. Here, as in the corresponding case in the previous section,

care is to be taken not to fancy that the line of measures, and the triangle determined by it, really lie in the plane they seem to lie in.

In this last case, the triangle lies in an imaginary inclined plane, and is no more vertical, as it seems to be, than the point of measures is on the ridge, as *it* seems to be: it is really in the infinitely distant horizon, which the ridge covers and coincides with.

Figure 10 also furnishes illustrations of two points of general interest.

85. The first of these is the use of the point V^X, the vanishing point of horizontal lines making an angle of 45° with the principal directions R and L, to determine V^N, and when V^M is given, the lines that slope up to the left being supposed to make the same angle with the ground as those that slope up to the right. If these inclinations are equal, the inclination of the planes RN and LM will be equal, as in the case of these roofs; their lines of intersection, P, will lie in vertical planes; their horizon will be a vertical line passing through V^X, as shown in the previous section (42); and V^P will be at the intersection of this horizon with HLM. If now HRN be drawn through V^R and N^P, V^N will be found at its intersection with HLZ, and $V^{N'}$ will be at an equal distance below.

The point V^{P_1}, which determines the direction of the line P_1, at the intersection of the two banks of earth in the farther corner of the barnyard, is found in like manner.

86. The second point is illustrated by Fig. 10, which shows how the true direction of the lines V^Q or $V^{Q'}$, whose vanishing points are at the distant intersection of the nearly parallel horizons HRN and HLM′, on HRN′ and HLM, may be obtained by means of two similar triangles, the common device for directing a third line to the intersection of two given lines as shown.

This is applied in Figure 10, to find the true direction of the left-hand line of the hipped roof, just below the point V^C.

XIX

PERSPECTIVE—SECTION 5

ON THE EXACT DETERMINATION OF THE DIRECTION AND MAGNITUDE OF PERSPECTIVE LINES

The first two sections were given to a general observation of the phenomena of perspective, in nature and in drawings, and the last two to the explanation of the making of such drawings, certain data being assumed.

It was assumed that the position of the principal vanishing

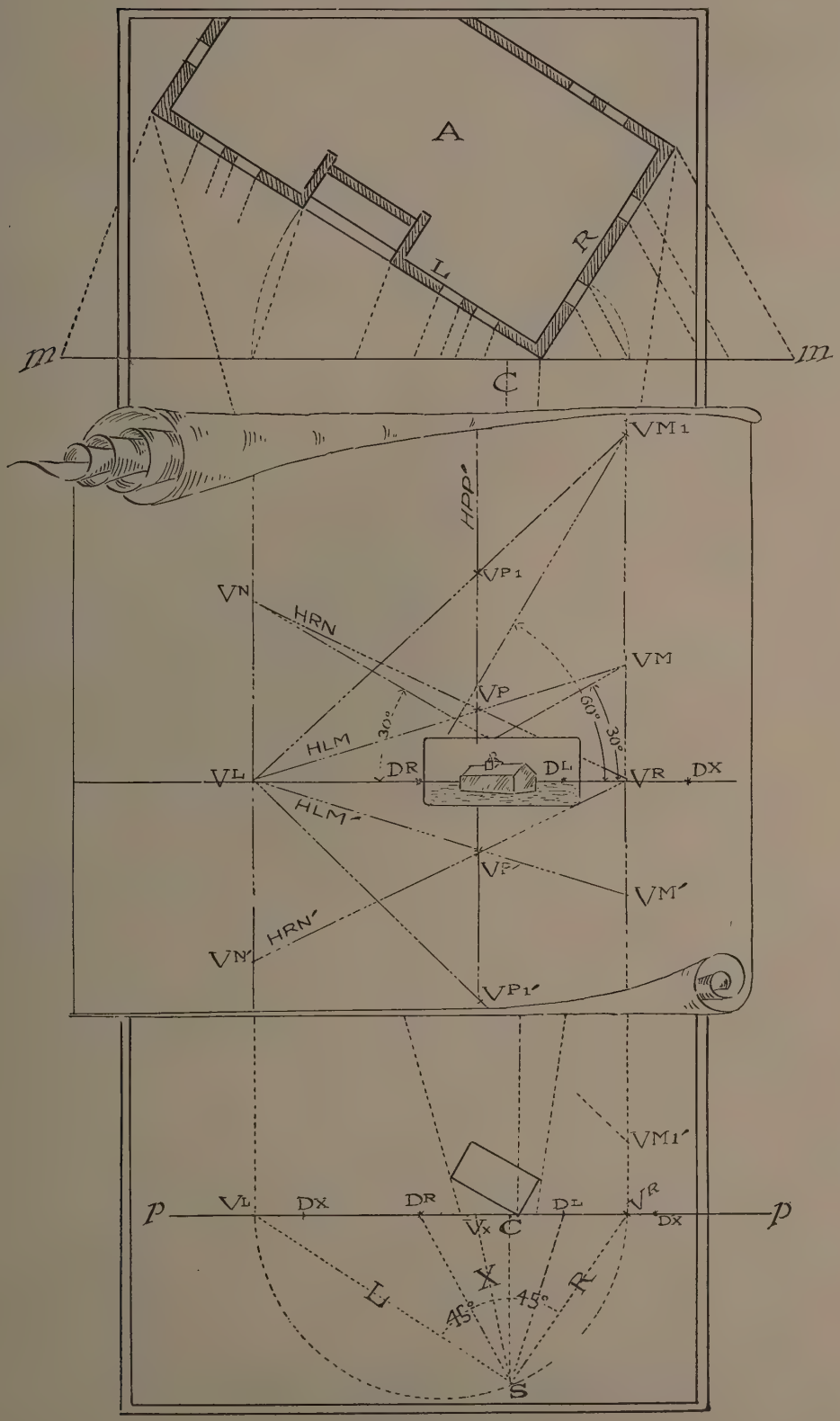

A
L
R
m
m
C
VM1
HPP'
VP1
VN
HRN
VM
VP
60°
30°
30°
HLM
VL
DR
DL
VR
DX
HLM'
VP'
VM'
HRN'
VN'
VP1'
VM1'
p
VL
DX
DR
VX
C
DL
VR
DX
p
L
X
R
45°
45°
S

Figure 13.

points, giving the direction of the principal lines, had been already determined, with more or less accuracy, by the eye or by the judgment, and that their length had also been fixed in the same way. The discussion showed how the position of other vanishing points and the length and direction of other lines could then be determined, and how any of the lines thus drawn could be divided up in any desired manner, that is to say, in any given proportion.

It is necessary, in order to conclude this part of the subject, to show how these data may be more precisely determined. It is necessary to show how, when the real direction of the lines is exactly known, their vanishing points may be fixed with precision, and how, when their real length is known, the exact length and position of their *perspective representations* may be determined.

The position of the object to be drawn, the position of the picture, and the position of the spectator's eye, must of course be known also.

Figure 13 shows how these questions are answered, showing in plan, and upon a reduced scale, the position of the spectator at the station point S; that of the picture at pp, which shows the plane of the picture edgewise, as it would appear looking down upon it; and that of the object to be represented at A. Two elevations of this object, which is a small house, showing its vertical dimensions, are given alongside; the plan and the two elevations together giving exact information as to the magnitude and direction of the lines defining it. The picture itself is shown between the plan of the house and its own plan, just as if the plane of the picture, pp, had been revolved backward into the plane of the paper.

The object is here represented as being about six times as far from the station point as the picture is, the picture being about eighty feet from the station point, and the nearest corner of the house about thirteen feet. It is this relation that obviously determines the *scale* of its perspective representation, which would be greater if the picture were farther from the station point, or the object nearer, and *vice versa*. But we shall come to the question of *scale* presently (94).

THE DIRECTION OF HORIZONTAL LINES

87. The first question is that of the direction to be given to the various perspective lines; we must determine the vanishing points of these various systems of lines, horizontal and inclined. Vertical lines, and all other lines parallel to the picture, will of course have their perspectives parallel to themselves (20). The horizontal lines belong to three systems, the directions of which are indicated in the plan of the little house as R and L, going off to the right and to the left, at right angles to each other; and X, dividing the angle between them, and making an angle of 45° with each.

If now the spectator, standing at S, looks in a direction parallel to R, he will see the vanishing point of that system of lines directly before his eye; that element of the system which passes through S is in fact seen endwise, appearing as a point covering and coinciding with the vanishing point of the system of right-hand horizontal lines which is in the infinitely distant horizon (6). The perspective of this vanishing point, V^R, in the plane of the picture, will be found exactly where this element pierces the picture, that is, where it crosses the line pp.

V^L and V^X can of course be found in the same way; and the center of the picture, V^C, the point nearest the station point and at the other extremity of the axis SV^C, is easily determined at the same time. Since R and L are at right angles, the triangle V^RSV^L is a right-angled triangle, and S lies on the circumference of a semi-circle of which V^R and V^L give the diameter. In the picture itself, just above, these points of course appear *on* the Horizon; for since these lines are all horizontal, their vanishing points lie in the horizon of the horizontal system of planes (13). HRZ and HLZ, the horizons of vertical planes parallel to the sides of the building, can now be drawn, as usual, through V^R and V^L; and HPP′, the horizon of the diagonal planes, through V^X. The vanishing points of any of the other horizontal lines, and the horizons of any other vertical planes, could of course be found in a similar manner.

A line perpendicular to the plane of the picture, and accordingly parallel to the axis, would have its vanishing point at V^C.

THE DIRECTION OF INCLINED LINES

88. It only remains to find the vanishing points of the inclined lines M and M′, N and N′, and thence, as before, the horizons of the roofs, and the vanishing points P and P′, of their hips and valleys. This is easily done by the aid of the elevations, which show the real inclination of these roofs and gables to be 60° for the lower slope, and 30° for the upper. If the spectator at S, then, while looking at V^R in the direction R, should raise his eyes at an angle of 30°, he would see V^M, the vanishing point of the upper slope of the gable, directly before him, the triangle V^MV^RS being right-angled at V^R. If now this triangle were revolved about the vertical side V^RV^M, so as to bring the station point, S, into the plane of the picture at D^R, it would appear in the picture above, as the triangle $V^MV^RD^R$, the angle at D^R being 30°.

Fig. 14 gives a perspective view of the plane of the picture pp, with the eye at the station point S, in front of it; the triangle in question is shown both in its original position and also as it appears when swung round into the plane of the picture.

89. It follows from this that if from V^R the distance V^RS is laid off along the Horizon, we obtain the point D^R; and if from

this point we draw a line at an angle of 30°, we shall obtain V^M at its intersection with HRZ.

In this same way D^L and V^N may be obtained by setting off the distance of $V^L S$ along the Horizon from V^L, and drawing the line $D^L V^N$, also at an angle of 30°.

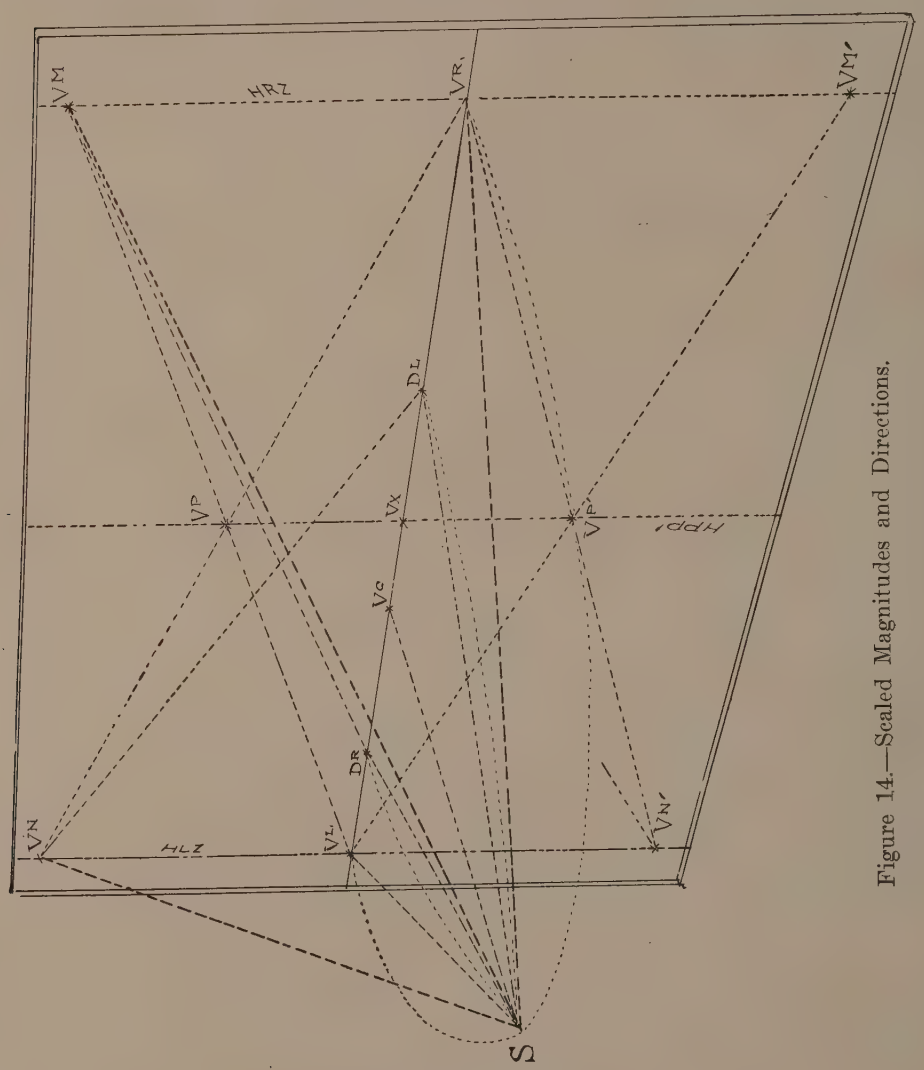


Figure 14.—Scaled Magnitudes and Directions.

POINTS OF DISTANCE

The points D^R and D^L are called the right-hand and left-hand *points of distance;* they show the distance of the station point from the right-hand and left-hand vanishing points.

It is to be observed that D^R is found on the left, and D^L on the right of V^C.

In the same way the vanishing points of every other horizontal line, as, for example, of X, has its corresponding point of

distance, found by setting off along the horizon its distance from S. Thus we have $V^X D^X$ equal to $V^X S$.

90. $V^{M'}$ and $V^{N'}$ will of course be seen as far below the Horizon as V^M and V^N are above it, and V^P and $V^{P'}$ will be at the intersection of the horizons of the inclined planes RN and LM, RN′ and LM′, as before.

Fig. 14 gives further illustration of most of these points. To prevent a confusion of lines, the centre, V^C, is taken on the left-hand side of the picture instead of on the right-hand side, as in Fig. 13.

TO FIND THE TRUE INCLINATION OF INCLINED LINES WHOSE PERSPECTIVES ARE GIVEN

91. By a reverse process, when the vanishing point of inclined lines is known, their *real* inclination can be discovered by drawing a line from this vanishing point to the point of distance of the horizontal line beneath them. Thus, in the figure a line from V^P to D^X would give the angle $V^P D^X V^X$, which is the true slope of the lines of intersection of the upper roofs.

92. If the lines M and N have different inclinations, the point V^P will not come over V^X, and the *distance* must be measured from the point of the horizon that it does come over.

The vanishing points of the steeper slopes of the lower roofs are found in like manner at V^{M_1}, V^{N_1}, etc.

THE LENGTH OF LINES PARALLEL TO THE PICTURE

93. The exact direction of perspective lines being thus determined, since the position of their vanishing points is thus exactly fixed, it now only remains to determine their length, and the position of some one point in each. For such lines as are parallel to the picture this is easy, for every such line may be considered to lie in a plane parallel to the picture, the center of which, or point in the plane nearest the eye, will have its perspective at V^C, the center of the picture; the perspective of the line in question will be parallel to the line itself, and its length and its distance from the center, V^C, and all other lengths and distances taken in that plane, will be less, as we have just seen (86), in proportion as the distance of the plane from the plane of the picture is greater. If, as in Fig. 13, the plane mm is six times as far from the spectator at S as the picture pp, all lines in mm will be drawn at one-sixth of their size, and be at one-sixth their distance from the center. The front corner of the house, for instance, which lies in the plane mm, is so drawn.

This imaginary plane mm, which is generally drawn through the nearest part of any object to be represented, is called a *plane of measures,* and, like the picture, is defined in position by the length and position of its axis, which coincides with that of the picture, but is generally a great many times as long.

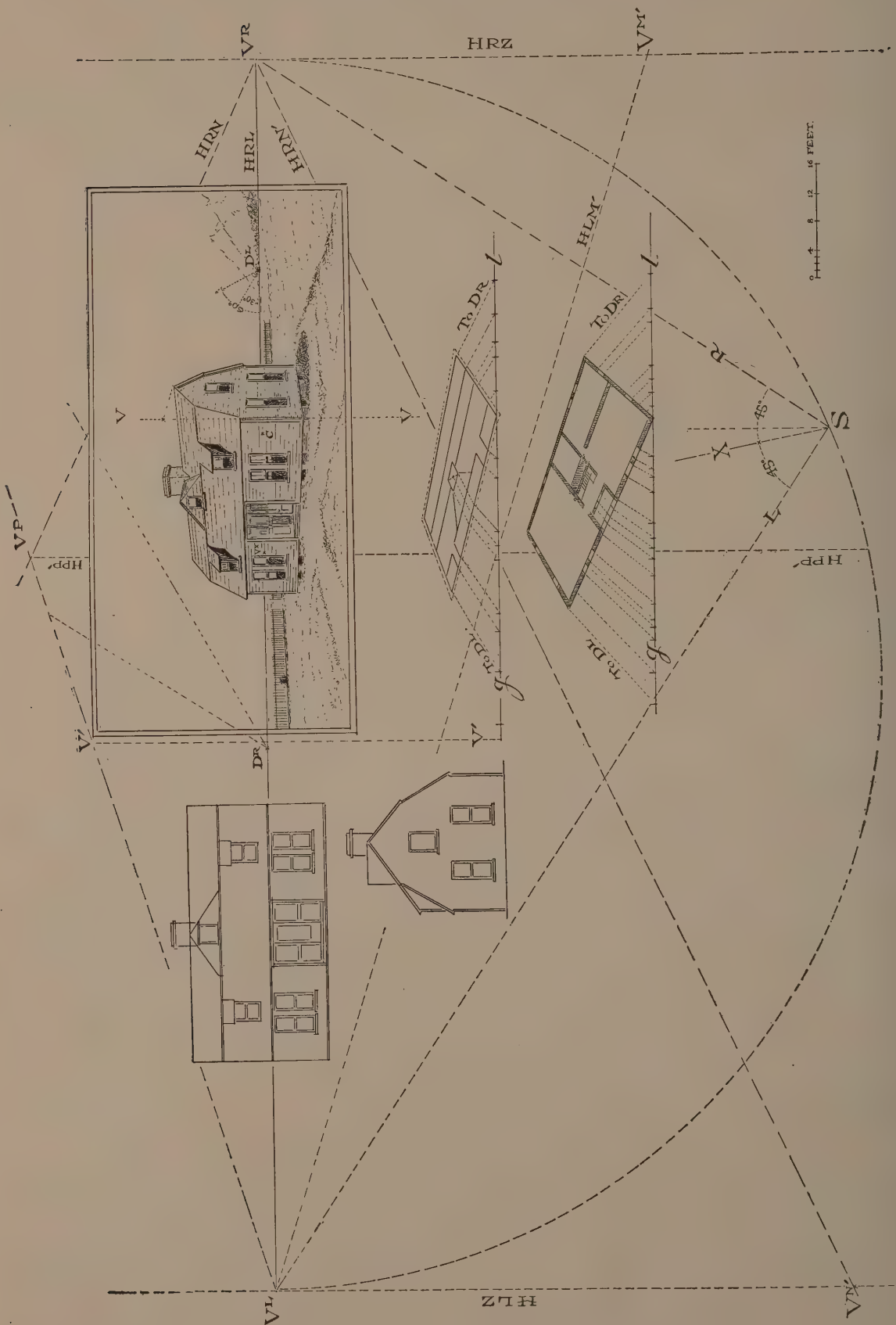


Figure 15.—Magnitudes and Directions by Scale.

Its relative distance behind the plane of the picture is commonly, of course, much greater than that shown in the figure, in which for perspicuity's sake, the picture is represented as being about eleven feet across and about thirteen feet from the spectator. The picture is commonly set only a few feet off, while the object represented is often a hundred times as many.

Sometimes, for convenience, *two* planes of measures are employed at different distances, lines in the farther one being drawn to a smaller scale than in the nearer one.

LINES IN THE PLANE OF MEASURES

94. It follows, from what has been said, that any line drawn in a plane of measures in any direction, horizontal, vertical, or inclined, is also parallel to the picture, and that its perspective will be parallel and proportional to it, *but on a smaller scale.* This scale depends on the relative distance of the picture-plane and the plane of measures from the eye, or station point. If the latter is twice or ten times as far away, lines drawn upon it will be presented in the picture one-half or one-tenth full size.

SCALE OF THE DRAWING

All lines in a plane of measures have their perspectives drawn to the same scale.

It is common in the case of large objects, such as buildings, to set the picture at just 1/96, 1/144, or 1/192 of the distance of the plane of measures, that is, of the object. Lines in the plane of measures are then represented 1/96, 1/144, or 1/192 full size, etc., that is to say, on a scale of $\frac{1}{8}$, 1/12, 1/16 of an inch to the foot.

The center of the plane of measures coincides in perspective with the point V^C, the center of the picture (93). The perspective of any other point in the plane of measures may be found by laying off its distance, according to the scale, in its real direction, in the plane of the picture.

95. Fig. 15, in which the various vanishing points and traces, and the points of distance, D^R and D^L, are determined as in the previous figure, illustrates this practice. The picture is supposed to be about six inches from the eye, as in the case of our previous illustrations. This is less than is desirable, but is as much as the scale of these illustrations permits.

The front corner of the building, through which the plane of *actual measures* is taken, is supposed to be a hundred and ninety-two times as far away, which is to say, ninety-six feet from the spectator, or ninety-five feet and a half behind the picture, the scale of the perspective of that corner being *one-sixteenth* of an inch to a foot. This corner being 8 feet high, is drawn half an inch high.

All other lines in the plane of measures are drawn to the same

scale, which is indeed the same scale as that to which the plan of the building is drawn in Fig. 13, and the elevations alongside. Dimensions can then be transferred directly from these drawings to Fig. 15, so long as the lines to which they apply lie in the same plane of measures. Such a line is the line VV, the line in which the planes of the front and end walls of the house intersect the plane of measures. Any such vertical line, lying in the plane of measures, is called a *line of vertical measures.* By setting off upon this line the heights of any part of the building, by scale, they can be transferred to their proper places by horizontal lines directed to the vanishing points. The height of the gable in the figure is determined in this way.

The line mm, also, in which the plane of measures intersects the horizontal plane on which the perspective plan is taken, is such a line. Its perspective, shown at gl, is called the *ground line,* or line of *horizontal measures,* and any dimensions can be laid off upon it at the same scale as upon the perspective of the vertical line; as it is parallel to the picture, the divisions of its perspective are proportional to those of the line itself.

By prolonging the planes of the other walls until they intersect the plane of measures, additional lines of vertical measures are obtained, such as V′V′, in the plane of the further gable. In the same way, every horizontal plane gives a line of horizontal measures, as shown in the case of the two perspective plans below.

THE PLANE OF THE PICTURE THE PLANE OF MEASURES

96. For very small objects the plane of measures, and with it the object itself, is brought nearer, and may even coincide with the plane of the picture. In this case, lines lying in it are drawn full size.

Sometimes, instead of taking the object of its real size at its real distance, we suppose a miniature of the object to be set up near at hand, of any convenient scale. In this case, also, the object may be supposed to be close to the plane of the picture, and the plane of the picture to coincide with the plane of measures. This is illustrated in Fig. 13, in which a small plan of the house is drawn in contact with the plane of the picture pp, just as a large plan, representing full size, is drawn in contact with the plane of measures mm, above, the whole being drawn at a scale of sixteen feet to the inch. Or we may regard Fig. 13 as drawn on the same scale as Fig. 15, that is to say, full size, considering the plane mm to be the plane of the picture, six inches from the eye at S, with a miniature of the building, a model made to the scale of a sixteenth of an inch to the foot, just behind it. In this case Fig. 15 represents the picture drawn on the plane mm, just as the little picture in Fig. 13 represents that drawn on the plane pp.

97. Having thus the means of drawing in any horizontal or vertical plane a line, lying in a plane of measures, upon which

dimensions can be laid off by scale, we have now to transfer these dimensions to other lines in the same plane.

If these lines also are parallel to the picture and to the plane of measures, the case presents no difficulty. It is only necessary to draw parallel lines from one line to the other. In the figure, for example, the heights laid off on the line of vertical measures VV, at the front corner, are transferred to the other corners and to other vertical lines by parallel lines directed to the vanishing points V^R and V^L. In this way the vertical dimensions of every part of an object, and the position of its horizontal lines, may be determined.

The length of any other lines parallel to the picture, horizontal, vertical, or inclined, may be obtained in a similar way from lines in the plane of measures parallel to them, and lying at the intersection of that plane with the planes in which they lie.

THE LENGTH OF HORIZONTAL LINES INCLINED TO THE PICTURE BY SCALE

98. To determine the length of horizontal lines not parallel to the picture, and to lay off given dimensions upon the perspective of such lines, we can employ a method similar to the method of triangles described in the last section. By that method we laid off upon such lines, parts proportional to parts taken upon a line of *proportional measures.* We now propose to lay off upon such perspective lines parts equal to parts taken upon a line of *real* measures. Any triangle will do to transfer proportional parts, but to transfer equal parts we must have an *isosceles triangle;* for it is only in isosceles triangles that the parts into which the adjacent sides are divided by lines drawn parallel to the base are equal, each to each.

LINES OF EQUAL MEASURES

This is illustrated by Fig. 13, in which the line mm, at the top, is the line of horizontal measures. The actual dimensions of the sides of the house and of the doors and windows are laid off on this line, and connected with the inclined lines of the plan by means of lines drawn parallel to the base of an isosceles triangle.

99. It is plain that what is here done in the orthographic plan could be done in a perspective plan if we knew in what direction to draw these parallel lines; that is to say, if we could find the vanishing point of the base of the isosceles triangle. And this is, in fact, very easy, for a simple inspection of the figure shows that the point of distance is the auxiliary vanishing point in question. If the spectator at S looks in the direction of the parallel lines by which the right-hand line R is divided, he will see D^R; and in like manner D^L is the vanishing point of the parallels by which distances taken on the line of horizontal measures are transferred to L.

From a further inspection of the figure, we can plainly see that this is as it should be. For the sides of the isosceles triangle at the top are by construction parallel to the sides of the triangle SV^RD^R and SV^LD^L. These last are accordingly isosceles too, and their two long sides should be equal.

The auxiliary vanishing points, then, should be just as far from the vanishing points as these last are from the station point; as the points of distance are, by construction. V^RD^R was originally taken equal to V^RS, and V^LD^L to V^LS (89).

100. The points of distance, then, are the vanishing points of the parallel lines which will intercept upon a perspective line, parts equal to those intercepted upon its line of measures.

This is illustrated in Fig. 15, where, in the perspective plan, parts laid off by scale on the ground line, or line of horizontal measures, are transferred in their true dimensions to the perspective lines R and L. In this way the length of the walls and the position and size of the doors and windows is exactly determined. These dimensions being already shown at the given scale in the little elevations, it suffices to transfer them directly from these drawings to the ground line with a measuring strip of paper.

In this way a complete and accurate perspective plan can easily be constructed; the length of all horizontal lines and the position of all vertical lines will then be known. The length of vertical lines, which gives the position of horizontal ones, is easily obtained, as we have seen, from vertical lines of measures.

The second perspective plan, above the other, gives the plan of the roof and dormers.

101. Fig. 13 affords an alternative method of obtaining the horizontal dimensions; that is to say, the position of the vertical perspective lines. If we again regard the plan at the top as the plan of a miniature house, or model, set six inches from the eye at S, and regard mm as the plane of the picture, in contact with it, we can, by drawing lines from every point in the plan to the station point, find just where every point will appear in the picture; the horizontal dimensions thus obtained can then be transferred directly to the picture in Fig. 15. They are shown by marks on the lower side of mm, and will be found to agree exactly with the dimensions obtained from the perspective plan.

This method, which is called that of *direct projection,* is often more convenient than the other, especially when the orthographic plan has previously been prepared, and when, as in the present case, the subject is simple.

ADVANTAGES OF THE PERSPECTIVE PLAN

But the method of the *perspective plan* is more convenient for designing in perspective, or for making a perspective drawing, as often has to be done, from mere sketches. It takes up less room in the vertical direction; it is less laborious, though requiring

more skill and knowledge; and it has the advantage previously pointed out,—that it enables the position of points at different levels to be separately determined, by the use of separate perspective plans, and enables several successive drawings to be made, if necessary, without repeating the bulk of labor, since the perspective plan can be made on a separate piece of paper and used more than once.

Moreover, the points established on a perspective plan explain themselves: it is clear at a glance, and after any lapse of time, which denotes the door, which the window.

THE MODUS OPERANDI

102. In making a perspective drawing, we generally fix first the points V^R and V^L as far apart as is convenient, then strike a semi-circle between them and take the point S in such a position upon it that SV^R and SV^L shall be parallel to the sides of the object to be drawn. The points of distance and other vanishing points, and the various horizons, can then be determined; the perspective plan drawn wherever is most convenient, and the perspective picture erected above it by the aid of vertical lines of measures. It is to be noticed that since the vanishing points and traces depend solely upon the *direction* of the lines and planes, not upon their *position* (11), the building may be set to the right or to the left of the center, below or above the Horizon, according as more or less of the left-hand side or of the roof is to be shown.

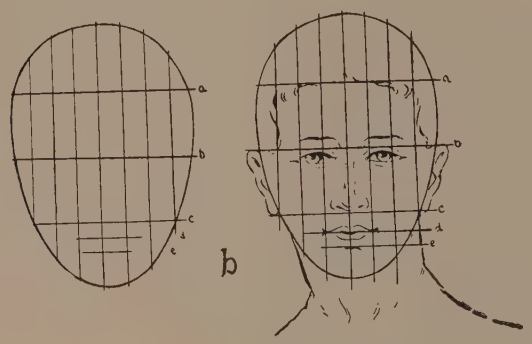
Care must be taken not to confound the point S with the point assumed for the front corner of the perspective plan, which is entirely independent of it. The revolved lines, also, D^RV^M, D^LV^N, etc. (89), must not be confounded with the horizons, V^LV^M, V^RV^N, etc.; that is to say, with HLM, HRN, etc."

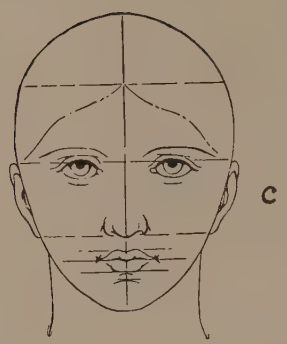
The foregoing section is one of inestimable value. The principles made clear will enable any bulletin or scenic artist to successfully cope with any perspective problem that he may encounter in a lifetime of activity.

The bulletin artist can, for instance, correctly show in perspective, and in true proportion to actual size, any commercial carton, such as butter packages, those for cereals, etc., and be absolutely sure of his ground.

The four perspective plates which accompany this treatise on perspective must be studied in conjunction with the text, or confusion will result and also a proportionate misunderstanding.

The more you study and delve into this treatise, the more you will get from it in actual understanding and real knowledge of the subject.





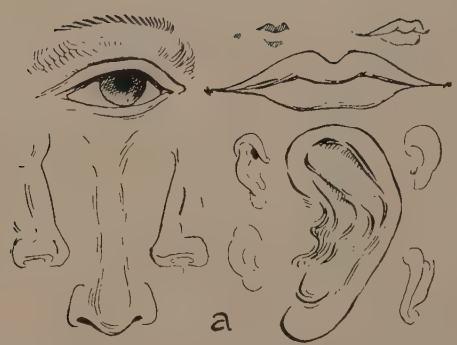


Figure 16.—Facial Composites.

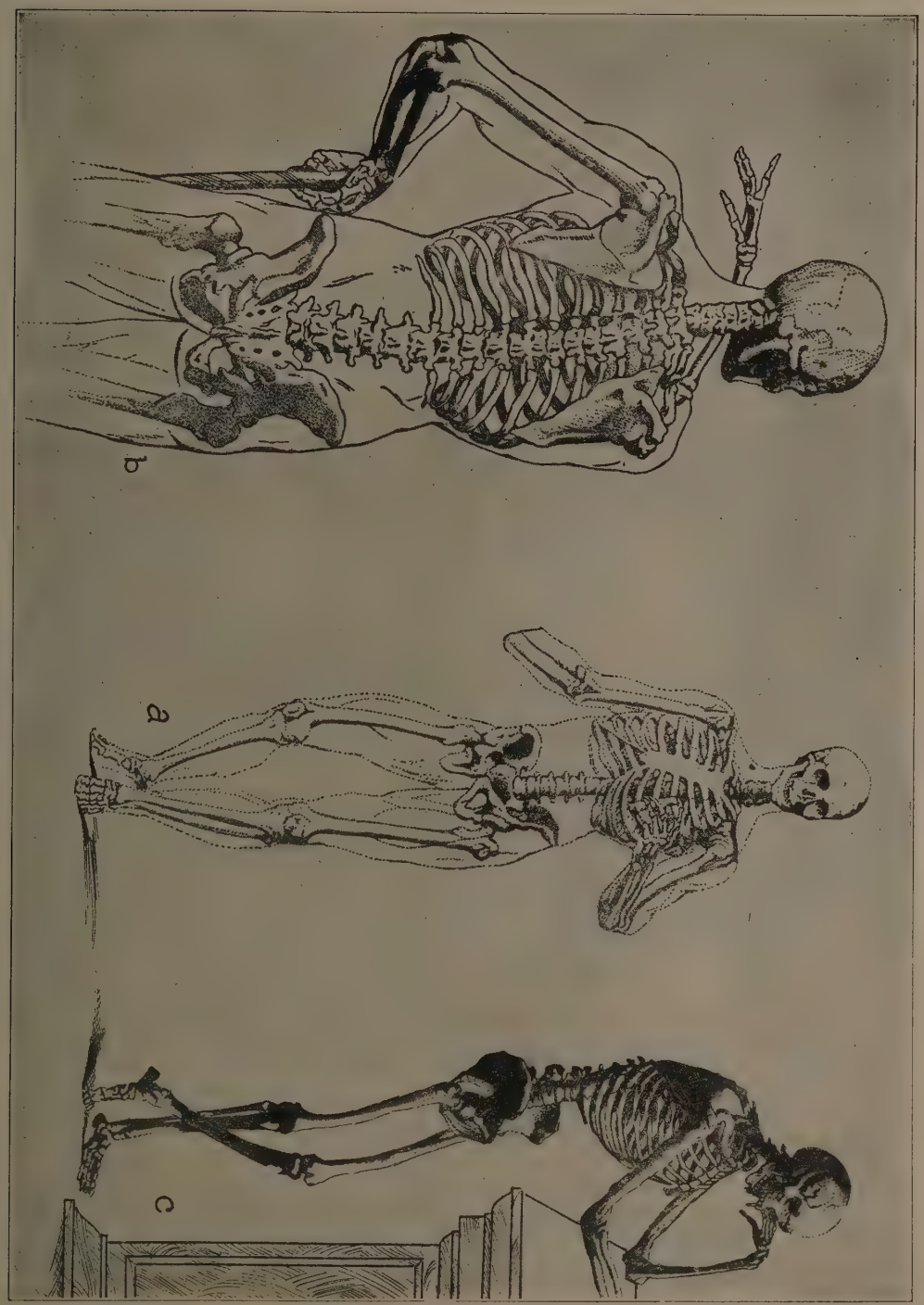


Figure 17.—Human Skeleton.

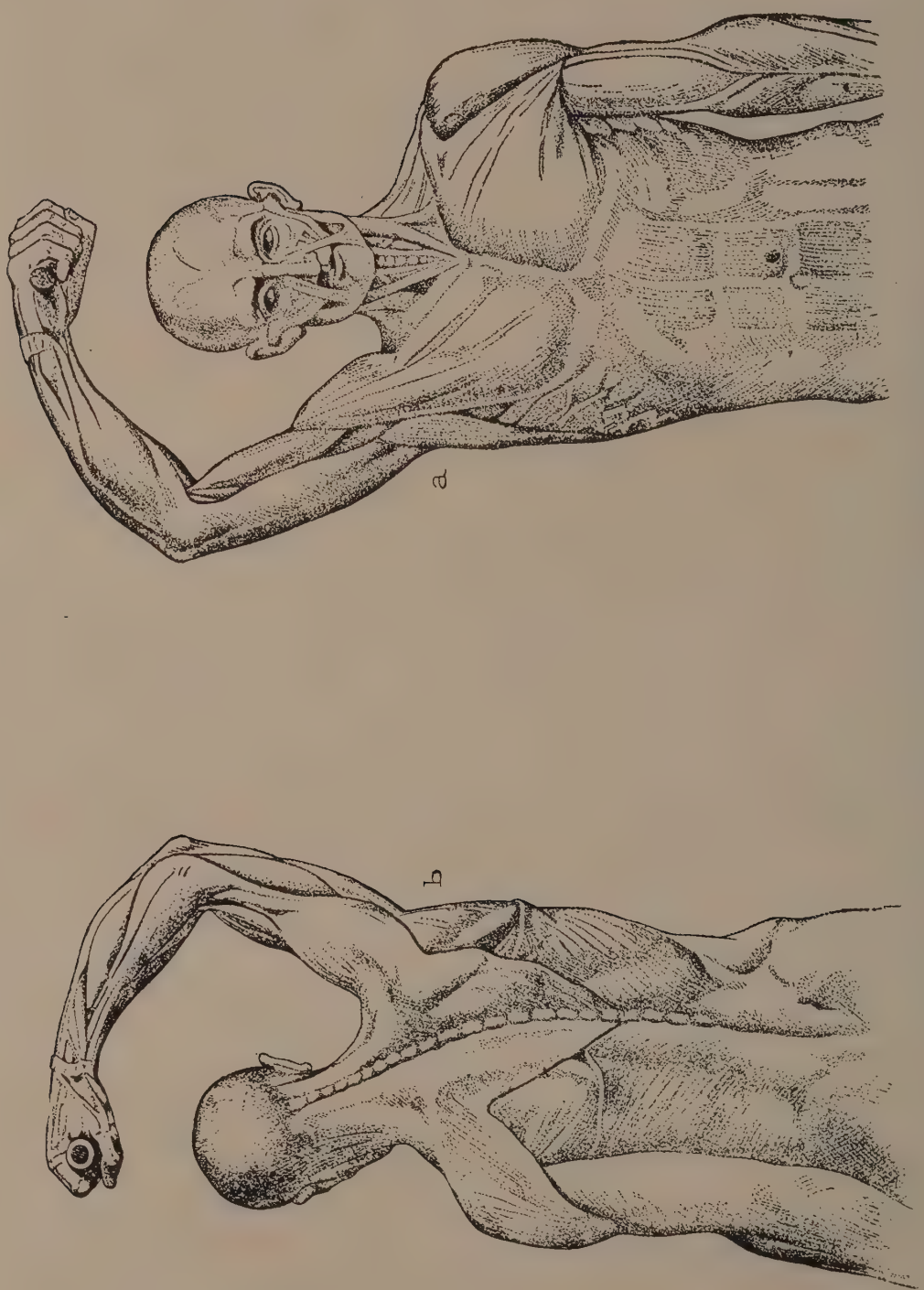


Figure 18.—Partial Figures, Divested of Skin, Showing Principal Muscles.

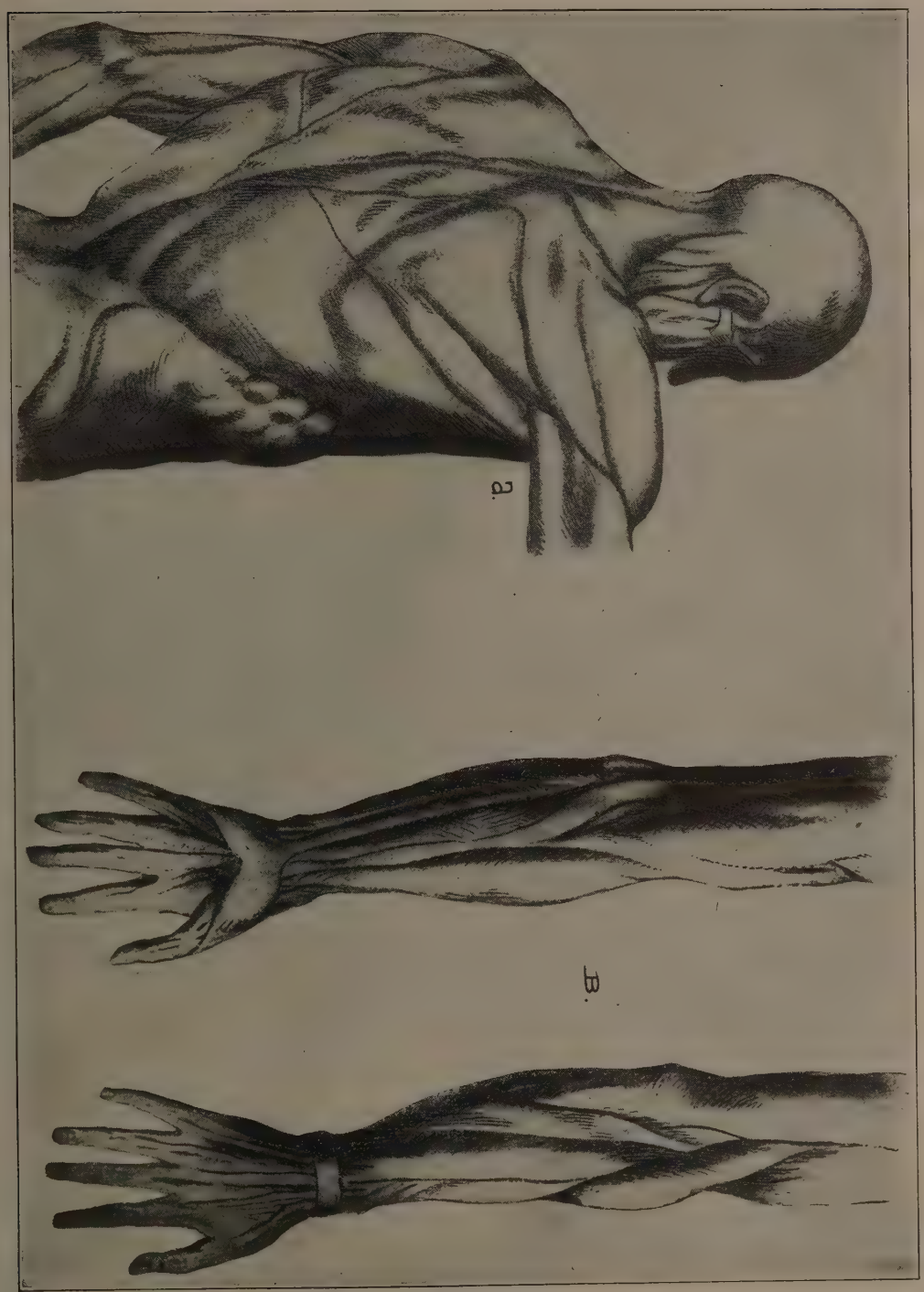


Figure 19.—Figures and Arms, Divested of Skin, Showing Principal Muscles.

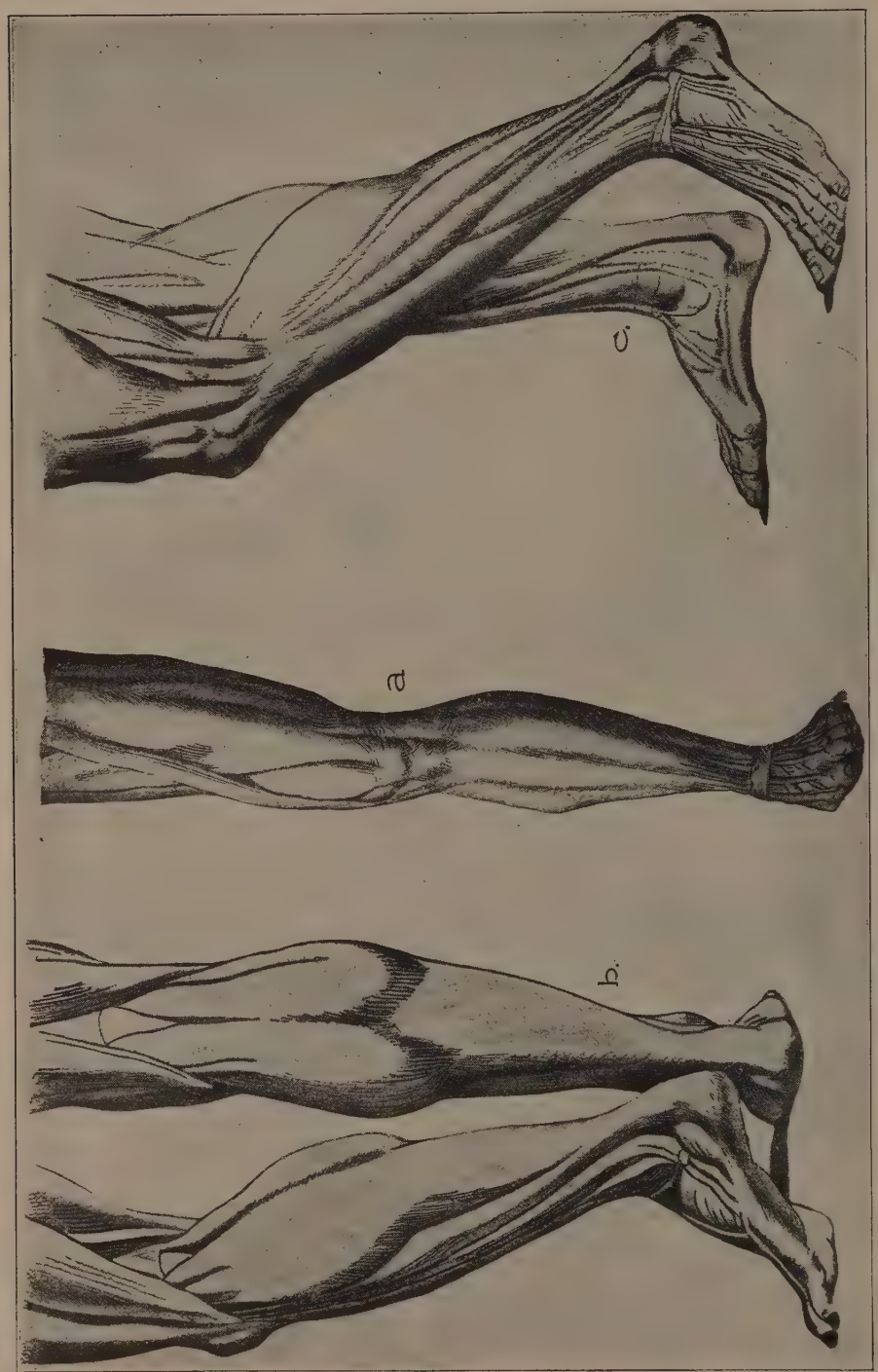


Figure 20.—Legs, Divested of Skin, Showing Muscles.

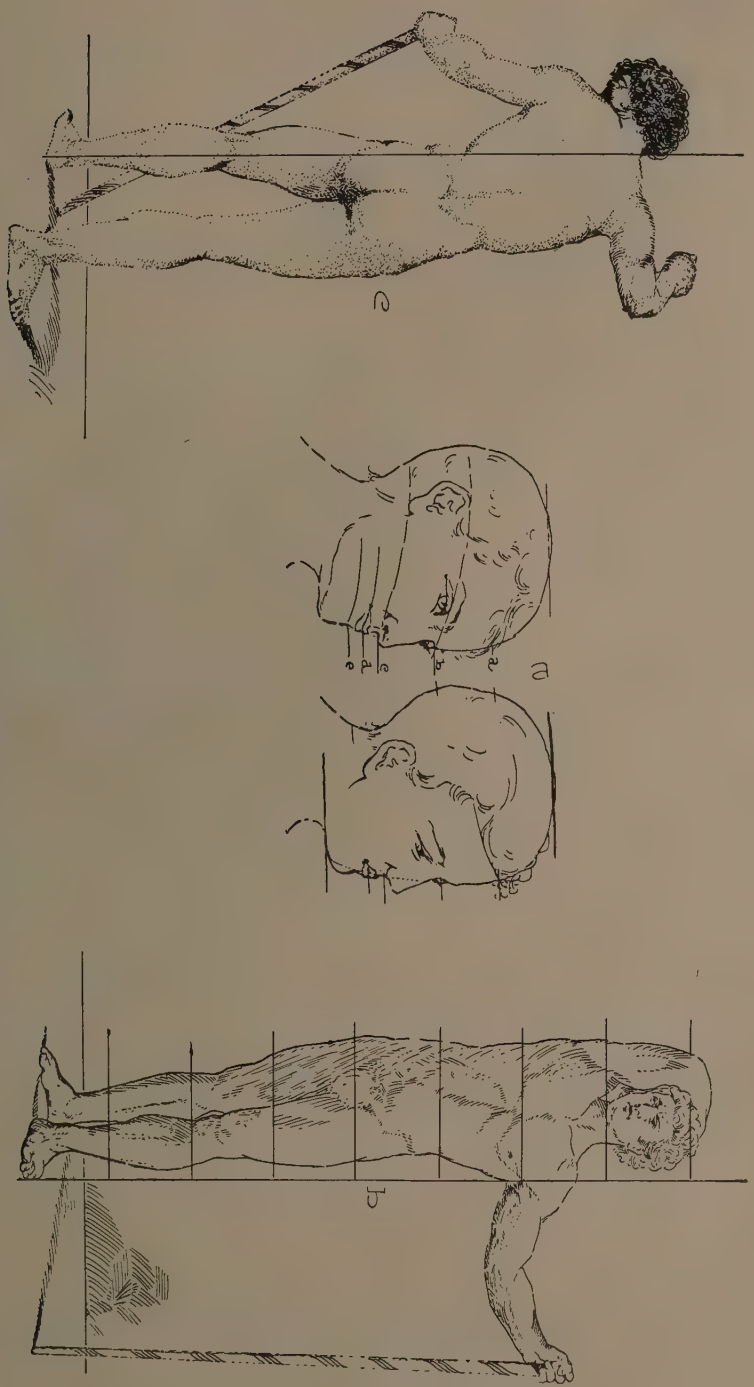


Figure 21.—Full Figures and Heads.

Figure 22.

Figure 23.

Figure 24.

Figure 25.

Figure 26.

Figure 27.—Ornament.

Figure 28.—Ornament.

Figure 29.—Panel Design.

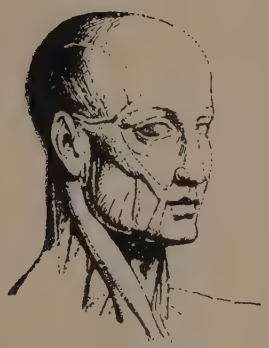
Figure 30.—Lunette with Spandrels Filled.

Figure 31.—Cherubs' Heads.

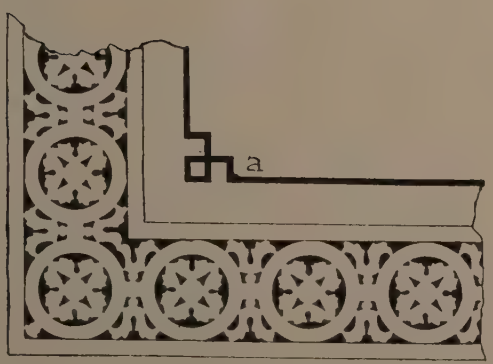
Figure 32.—Panel.

d.

c



b



a

Figure 33.—Head and Composite Ornament.

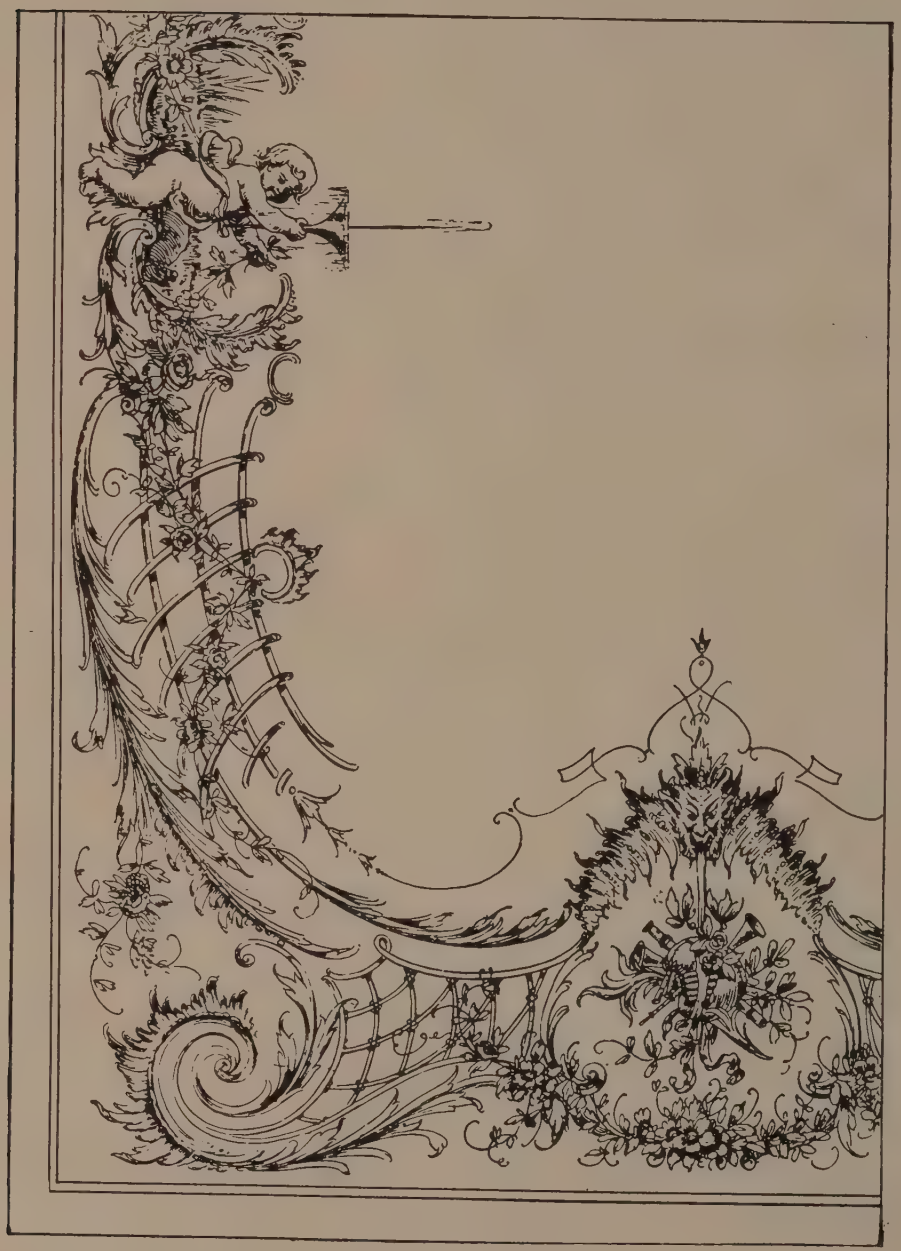


Figure 34.—Ornament.

Figure 35.—Panel Design.

Figure 36.—Panel Design.

Figure 37.—Lunette with Spandrels Filled.

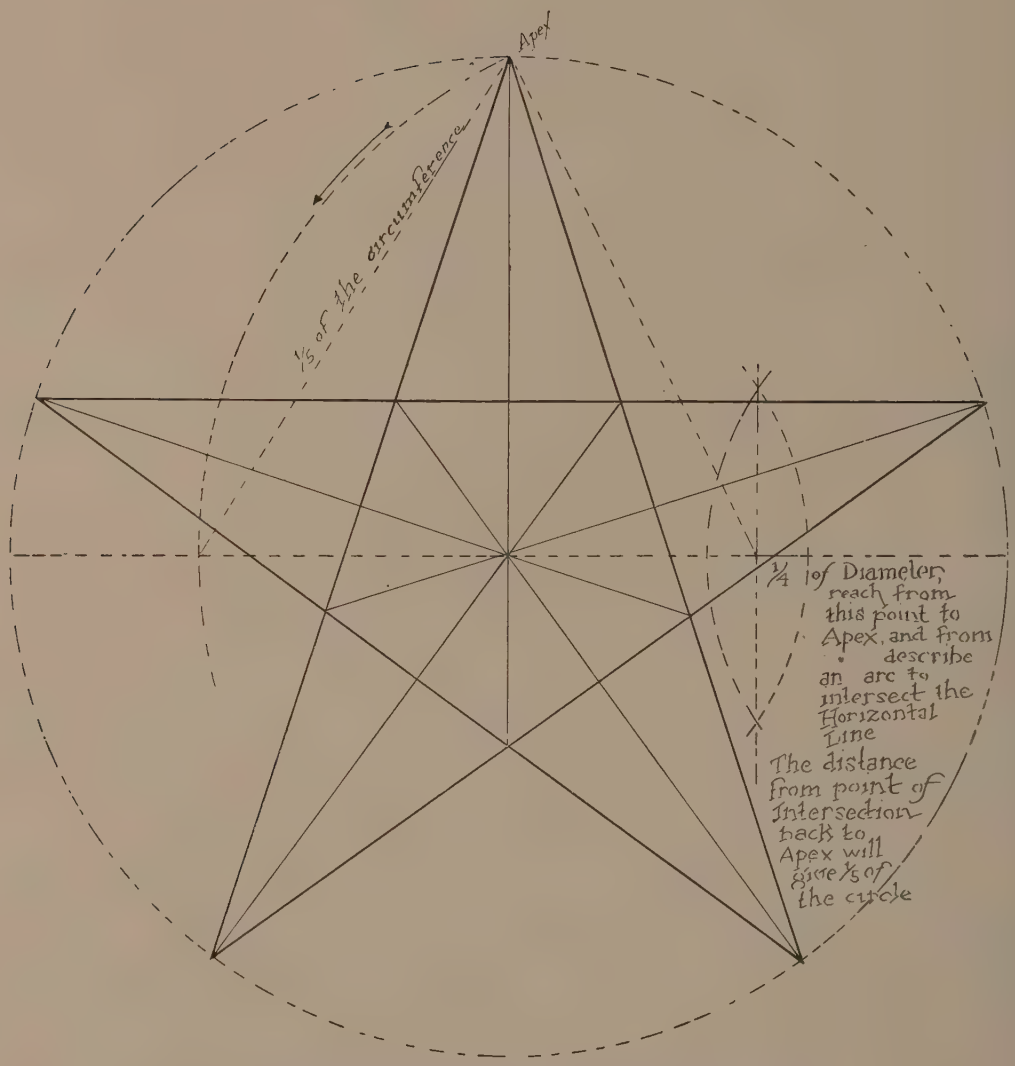

Apex
1/5 of the circumference
1/4 of Diameter, reach from this point to Apex, and from describe an arc to intersect the Horizontal Line
The distance from point of intersection back to Apex will give 1/5 of the circle

Figure 38.—Method of Quickly Dividing Any Circle into Fifths.

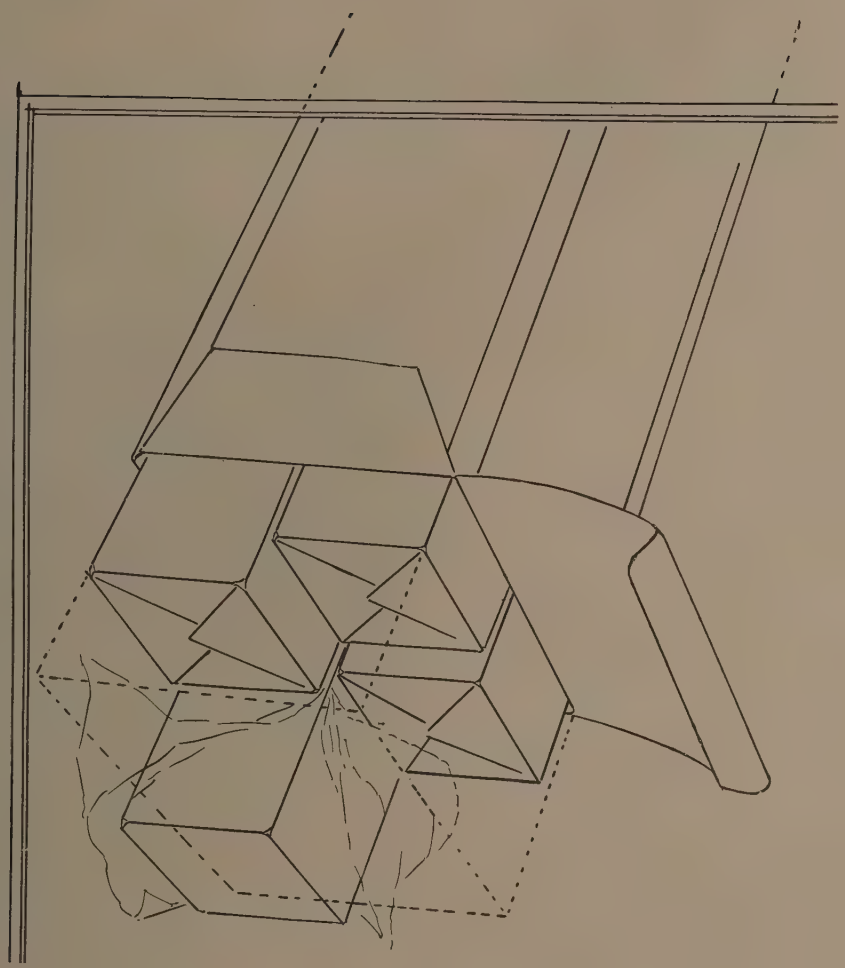


Figure 39.—Butter Carton in Perspective.

PART II

SCENE PAINTING

PART II

THEATRICAL SCENE PAINTING IN DISTEMPER

I

THE STUDIO

It is needless to say that scene painting requires a special studio, with special equipment—special building, special frames on which the scenes are painted, painting bridge, palettes, skylights, and trenches, or slots, in the floor into which, or through which, painting frames are raised or lowered to render every foot of space on the "stretch" easily accessible; also many minor or subordinate implements which will receive due mention.

An ordinary large store room can never be successfully used as a scenic studio, for the reason that it lacks height, which is the principal factor.

Most, if not all, of the large scenic studios have been built to order—designed and planned for the sole purpose of painting theatrical scenery—and are marvels of completeness and adaptability. However, many noted scenic artists doing business in a comparatively small way have converted old churches, hay barns (in the suburbs of cities), old skating rinks, old armories (with the preference for old churches) into suitable studios.

When an old church is used, it is only necessary to raise stanchions in front of the gallery all the way around, taking one side of the auditorium for the stationary frame and bridge, and the opposite side of the auditorium for the movable frame, while the ends can be used for the erection of small movable frames. The space under the gallery is used for construction of set pieces and general stage carpentering, as well as for stock room, etc. The roof is opened the entire length of the auditorium, and skylights fitted watertight in the openings.

BUILDING A STUDIO

If one desires to build a studio, it can be accomplished at comparatively small cost, with but one object and purpose in view—that of utility. Adopting the barn or warehouse type of construction, and taking the precaution to use heavy timber in the framing of the building—size of main building to be 30 ft. by 60 ft., corner posts to be 35 ft., with 50-ft. posts to peak of roof—the roof should

be of the mansard type, which will give a roomy "fly" or loft for the housing of "bull" wheels and gear of painting-frames and movable bridge.

Erect an "L," or addition, 60 ft. by 20 ft., at the side of the main building, sloping the roof from eaves down to 10-ft. corner posts. Sheathe with 1 in. by 12 in. rough pine and cover sides and ends with corrugated iron. Cover the roof tightly with the same board material and cut a generous number of small skylights in the roof (raising the frames a few inches above the roof line in order to waterproof them). Glaze the sash with 8 by 10 wired glass, and have the sash extend beyond the edges of the frame, with battens on the inside to make them fit snugly; then proceed to seal the skylight frames at the roof line absolutely watertight, and finish the roof with roofing paper and gravel.

Provide the skylights on the inside with screens of muslin or burlap, mounting it upon light frames and hinging the frames to the skylight frames. Also hinge the skylight sash so they can be raised at will for the purpose of ventilation. By attaching small lines and pulleys the lights and screens can be manipulated from the floor. The screens are for the purpose of screening against direct sunlight and cannot be dispensed with.

Cut double sliding doors in the "L" section of the building, and enough "sidelight" windows in the walls to give satisfactory lighting to this portion of the studio, which can also be lighted with skylights in the roof at your option.

In the main building a trench must be excavated on the side selected for the movable frame. It should be 10 feet deep, 18 inches wide, and the full length of the building, and should be walled with brick or concrete to render it watertight. When the trench is completed, the studio can be floored with any suitable flooring material.

On the trench side rig the movable frame and its gear (as fully described in another section); also erect a stationary bridge along the front of the frame, bordering the brink of the trench. The bridge should be 50 feet long, 10 feet wide, and 10 feet high, with steps at each end; all built strong and substantial.

On the wall opposite, erect the stationary frame and rig the movable bridge and its gear. Reserve a part of the end walls of the studio for smaller frames, which only need to be counterbalanced and provided with single hauling lines made fast to the center of the frame, passed upward to a flat pulley and over to a pulley at the side, and downward to a cleat.

The small frames will be found convenient for the painting of "wings" and small profiles that enter into the creation of set pieces, etc. Behind the stationary "grand frame" a stationary "border frame" can be erected at a convenient height from the floor, and should be 50 feet by 8 feet. All sizes of borders can be executed upon this frame, as recourse can be had to portable strips

which can be temporarily nailed or clamped to the frame for intermediate or small sizes.

Against the end wall of the "L," erect the "color bench." This should be 3 feet 6 inches high, 12 feet long, and 4 feet wide, with shelving above for storage of paint stock and pots, a shelf or two below for the same purpose, and a few drawers in the bench for the safekeeping of sundries. Cover the top of the bench with zinc, and at one end securely bolt a 4-gallon paint mill for the quick grinding of colors. Also, build a few lockers against the wall, near the bench; they will be a great convenience for the storage of reserve stock and sundries in general. Against the opposite wall erect an ordinary carpenter's work-bench with a vise.

Set the glue caldron near the color bench, and have city water piped so the tap will be near it. The glue caldron is simply a galvanized iron vessel holding 8 or 10 gallons of water, in which is suspended a smaller vessel holding 3 or 4 gallons of glue. Provide a hinged cover for the larger vessel, with small steam vents in it. The cover will prevent the glue from "skinning" on top, which is a disadvantage. Keep a long-handled dipper nearby as a glue dipper. Pipe a gas burner underneath the caldron, setting the caldron upon legs. If gas is not available, use an oil stove or an ordinary laundry stove.

The studio can be heated with a hot blast stove placed in each corner. Short-pipe the stoves into tile chimneys built in each corner of the studio.

For night work, use either gas or electric light. If gas, suspend 12-foot pipes from beans through the center of the studio, using small lines and pulleys in order to raise and lower them. Fit each gaspipe with ordinary jets placed 12 inches apart; connect the pipes to service pipe with long pieces of flexible gas hose.

If electric service can be had (which is far better in every way), suspend 12-foot conduit pipes to which attach wiring strip. Wire and install receptacles 10 inches apart; connect to service with long extension cord and lead it to wall socket.

II

GENERAL EQUIPMENT

Frames. The "grand frame" should be 40 feet wide and 28 feet high. Construct from 1-inch by 6-inch white pine lumber, laid flat, with strong reinforced corners and well braced with 1-inch by 4-inch strips, also flat. Nail 1-inch by 2-inch strips around the outer edge, allowing it to project three-fourths of an inch above the face of frame. (This is the mounting strip, and, projecting as it does from the face of frame, will prevent canvas from adhering to frame face when sized or primed.)

Hang the frame by fastening a strong iron eyebolt at each upper corner; pass ½-inch wire cable into the eyes of the bolts, and fasten with clip made for the purpose. Set iron pulleys (bracket type) in rafter or beam above the frame and in line with the vertical edges of the frame at each end; set another pulley 12 inches to the right and to the left of the pulleys first named, for the purpose of giving counterweights clearance as they pass up and down, as the frame is raised or lowered. Pass the cables through the pulleys and drop them parallel to the edges of frame. Fasten round 8-inch disks of lead to the ends of cables by splicing an eye bight in the cable end; pass a short iron bar through the eye, which will support the disk. For weights mold 5-, 10-, and 20-pound disks of lead similar to old-fashioned scale weights. Have enough of each to give each cable 75 pounds to start with, and enough extra weights so that more can be added should occasion require it, with the one object in view, namely, counterbalancing the frame so as to make the gross weight of frame easy to raise and lower by aid of the capstan.

The *capstan* and *purchase wheel* should be placed in position in the loft or "flies" of the studio, and fastened to beams or rafters. It is advisable to have the axle set at right angles with the wall (although it can be set parallel to the wall with a trifle more rigging, as will be explained), and it can be located centrally above the frame or to the left or right of the center. To the extreme right is preferable. Capstan and purchase wheel can be constructed from 1-inch lumber, as follows (except the axle, which must be 4 inches by 4 inches, four feet long): Drive 1-inch steel shafting into end of axle, projecting sufficiently to engage boxed bearings (any machinists' supply house can furnish them); or regular shafting hangers can be used to advantage if height of studio will permit, and they can be above or below the beam; that is, bolted to top edge or bottom edge.

Reserve at least 18 inches of the *end* of the axle for the capstan spool,—which *end,* when in place, should be next to the wall directly over the frame. This spool can be easily built up on the 4-inch by 4-inch by facing each side of it with segments of the circle cut out of 1-inch lumber. After the circle has been raised on all four sides of the square timber, proceed to cover or "drum" it entirely with 1-inch by 1-inch by 18-inch strips. This will give the spool around which the hauling cable is wound, the ends being passed over the pulleys and down to eyebolts, which are fastened to the top edge of frame about 4 feet from each corner.

The purchase or "bull" wheel can be built around the axle at the inside end of the spool, and 1-inch lumber is used. The wheel should be 4 feet in diameter. Start it by building an 18-inch hub around the axle, using segments of 1-inch lumber, one side of which must set flush against the inside end of the spool. Spread

the other side of the hub 10 inches along the axle and insert spokes 1 inch by 9 inches by 24 inches. Notch the terminal or outside ends of the spokes similar to the notch in an old-fashioned bootjack. These notches will afford the grip desired in the hauling line.

The felloes of the wheel can be cut from 1-inch by 6-inch lumber in short segments. Spread the spokes about 6 inches apart at the rim, and finish by having felloes on each side of the wheel to correspond with the hub plates. This will afford a large, strong, drum-shaped wheel comparatively light in weight.

As before stated, if the beams run parallel to the frame, it will only be necessary to "lag bolt" boxed bearings to the top or bottom edges of the same, whichever will give the best clearance.

If the beams are crosswise, or at right angles to the frame and wall, the bull wheel can be set without any great inconvenience. It will simply alter its relative position to the frame and make it necessary to set two more pulleys in the beam or wall, in line with the spool and horizontal to the axle. Through these pulleys must pass the hauling cable before passing through the pulleys which lead the cables vertically to the eyebolts in the frame.

All pulleys used should be of the projecting type, with strong bearings and housing, and pulley wheels 4 inches in diameter. Use lag screws to fasten them in position.

When ready to "rig up," locate the position of the bull wheel first and set it, using shafting hangers, boxed bearings, or capstan bench of your own construction. (The bench is easily made—simply lay down two 2-inch by 4-inch by 5 feet; raise "legs" or "knees" from center, have them 2 inches by 4 inches by 3 feet; brace from each side with 2-inch by 4-inch, mitered to angles, and set boxed bearings at outer points of "knees," using ordinary bolts and short pieces of angle iron at sides, which will hold same securely; fasten or hang this bench in position with heavy lag screws.)

After the wheel is in position, set pulleys in line with the capstan axle, also in horizontal line in the space afforded above the frame. Pass counterbalance cables through *their* pulleys and make fast to corners of the frame. "Weight up" the cables until weight of frame is in excess of counterbalance weights about 50 or 60 pounds. Then wind hauling cable around capstan spool, taking six or seven turns (being careful to start with center of the cable in order to have cable of equal length as it leads from capstan); pass hauling cable through pulleys down to eyebolts in frame and make fast.

Then pass 1½-inch manila hawser over the bull wheel and have the ends reach the floor. Splice the ends together.

As the extreme right is the preferable position for the bull wheel, it is only necessary to bolt a big cleat against the wall,

breast high; the hauling hawser is then made fast by taking a half-hitch on the cleat or cavel.

Note.—The frame will not need "ways" or guide bars on the wall. Allow it to hang loose.

III

THE BRIDGE

Construct the bridge at least 8 feet wide by 50 feet long, making a box frame from 2-inch by 6-inch by 12-foot lumber, splicing wherever necessary to make up the length. Use plenty of cross pieces, and brace the corners strongly. Bolt eyebolts to the bottom edges at the corners and at the center of the ends; fasten ¾-inch wire cables to these eyebolts and run from end to end over short iron trusses, drawing them taut with turnbuckles. This will give the bridge strength and rigidity.

Floor the platform with ordinary flooring crosswise of the frame. Suspend it from the four corners by means of ¾-inch wire cables fastened to the corners with eyebolts and passed up to and through heavy pulleys in the beams of the studio; then counterbalance heavily.

Then erect a stanchion at the center of each end of the bridge, from floor to beam or rafter, using 4-inch by 6-inch timber. On the inside face of each stanchion (the face presented to the bridge), lag bolt 2 by 4s the entire length, flush with the side edges (bevel them slightly before fastening). These will form a groove in the stanchion, and a 2-inch by 4-inch block, also beveled, bolted to each end of the platform and centered to engage and slide in the groove, will give the "way" or guide for the bridge. Lubricate the groove with common axle grease.

For raising and lowering the bridge, use the same type and size of bull wheel as on the "grand frame." Hang or set it in position on beams or rafters, making sure to have the axle at right angles or crosswise of the bridge platform and at one end, distant from the stanchion enough to clear the bull wheel nicely (3 or 4 feet to axle is sufficient, so that the hauling line will fall or hang quite near the stanchion). Have the spool in the center of the axle, midway from the ends of same. After winding a few turns of the hauling line or cable on the spool, pass the cable ends each way in a horizontal line to heavy pulleys bolted to inside face of the stanchions; then through the pulleys and fasten to heavy eyebolts bolted in the floor of the bridge, four inches in from the blocks which slide in the upright grooves.

On the bull wheel end of the bridge erect a rail, using 4 by 4s for posts and 2 by 4s for top rail. Bolt a big cleat midway of

the rail, preferably on the midway post, for making fast the hauling line. This completes the bridge.

Erect a ladder at the end away from bull wheel and along the stanchion—to give access to the bridge at any elevation without having to lower away.

The *boomerang* is nothing more nor less than a large portable set of steps or stepladder, and should be built strongly of 2 by 4s. It should be at least 10 feet high and 10 feet at the base. Have the steps 4 feet wide by 2 feet 6 inches deep, of 1-inch lumber. Equip with heavy piano castors, so that it may be moved about easily. It will be found very handy for general work about the studio, touching up, etc.

IV

THE PALETTE AND BRUSHES

The scenic artist's *palette* is of the bench type, made as follows: Simply construct a table 12 feet long, 30 inches wide, and 3 feet 6 inches high. Have the top planed smooth and cover with white oil cloth. Raise side boards around both ends and one side, of 1-inch by 4-inch pine. Against the strip on the side set the color trough, which is constructed of two half-inch boards joined at the bottom with squared ends to keep from upsetting. It should be 4 inches high, 10 inches wide, and run the full length of the palette. Divide it into 5-inch color compartments, with half-inch triangular divisions. The trough side is the back of the palette and remains so.

Put in a shelf at the bottom, a few inches from the floor, and also provide the palette with two or three drawers, which will always be handy for the safe keeping of studies and models; also one drawer will serve for brush keeper when brushes are not in use.

In addition to a full set of brushes (listed elsewhere), each palette is equipped with a large sponge, size pan, water pan, "cat-o'-nine" for flogging charcoal after a drawing is inked in, a long porte-crayon, several sizes of straight-edges from three feet up to seven feet, a bow snap line, a long thin hardwood pole with nail in one end for holding snap line at high points, a loose 75-foot chalk line, a generous supply of heavy scenic artist's charcoal, also some small artist's charcoal (it comes in small sticks), also an ordinary musician's music rack, which will be found a great convenience for the support of the sketch or model, and can be carried about and set close at hand at any point along the "stretch."

Also have two or three "pounce bags" made as follows: Take pieces of open muslin, old stocking, or any kind of cloth having open weave. Place a sufficient quantity of powdered charcoal in one piece, dry Vandyke brown in another, and whiting in another. Then draw up the four corners of each and tie them together with a piece of string, so as to form a round pad, which is to be rubbed over the pounce pattern as it is held in position against the "stretch."

Note.—Hereafter the mounted or strained canvas on which a scene is being painted will be called "the stretch," which is the professional term used by scenic artists.

Porte-crayon. Take an ordinary jointed fishing-rod and strip off the eyelets through which the line passes when used for a fishing-rod; attach the large-sized artist's porte-crayon, or crayon holder, to the tapered end, and it is ready for use. It is the most important implement used in a scenic studio. With it the artist strikes in most, if not all, of his drawing that enters into his composition. It answers for preliminary blocking in, as well as for the serious drawing in of all big masses and lines; even for blocking in small figures and heads which are later drawn in at closer range or at arm's length. The use of the porte-crayon enables the artist to stand away from his "stretch," and, holding the crayon at arm's length, he readily controls proportions of his drawing by reason of the increase of his latitude of vision, enabling him to view practically the whole stretch.

The *cat-o'-nine,* or *flogger.* Take a short piece of broom handle (16 inches will do) and around one end of it tack a dozen or more narrow strips of canvas about 20 inches long. As before stated, it is for flogging or clearing away charcoal after a drawing is "inked in," or for the removal of lines not wanted.

Straight-edges. Of these, three or four will be required—one 6 feet long and 4 inches wide, which should be divided into feet and inches for measuring purposes; one 4 feet by 4 inches wide, one 7 feet by 4 inches. They should be thin and light weight, and one must be *very thin* and strong and pliable enough to bear bending (holding in bent position with a piece of copper wire). This curved edge is for the purpose of drawing and running curves or arches.

The straight-edges can have small blocks tacked to their centers as handles, and are used thus: Grasp the handle of the edge with the left hand and press the lower edge against the canvas, keeping the upper edge away from it. Now, resting your brush against the upper or clear edge, draw it along the edge (with the brush lightly touching the canvas) with a quick, sure stroke, and thus rule or run the line.

Note.—It is a good plan to tack small half-round molding midway of the "edges" from end to end. The molding will enable

the artist to lift the working edge away from the surface by simply rocking the edge either way.

BRUSHES

Each palette should be provided with the following brushes:

Four Extra "New York Standard" kalsomine brushes, No. 7, 7 inches wide.

Four stencil and glue brushes, yellow bristles, set in patent metal binding and bridled with wire, Nos. 8, 12, 16, and 20.

Artists' and fresco brushes—chiseled: one 1-inch, one 1¼-inch, one 1½-inch, one 1¾-inch, and one 2-inch.

Hoyt's Special flat scenic brushes—extra long: Nos. 1 to 6, inclusive, and 1-inch, 1¼-inch, and 1½-inch.

Hoyt's Special round scenic brushes—same style as the flat: Nos. 1 to 10, inclusive.

Angular bristle fresco brushes—tin bound, flat cedar handles, especially made for scenic artists and fresco painters: One ½-inch, one ¾-inch, one 1-inch, one 1¼-inch, one 1½-inch.

"Fresco Stencil" brushes—Long, polished, black handles, finest white French bristles: One-half doz. No. 100.

Superfine bristle fresco Liners—Two doz. assorted, Nos. 1 to 6.

Superfine flat bristle fresco brushes—Extra large, finest French bristles, in tin ferrules, polished handles: ⅝-inch, ¾-inch, ⅞-inch, 1-inch, 1¼-inch, 1½-inch, ¼ doz. of each.

Artists' extra fine oxhair brushes, long—¼ doz. Nos. 1 to 6, flat; ¼ doz. Nos. 1 to 6, round; ¼ doz. of each, Nos. 14, 16, 18, 20, flat; ¼ doz. each, Nos. 14, 16, 18, 20, round.

Superfine round bristle fresco brushes—Extra large: Nos. 12 to 22, inclusive, ¼ doz. of each.

The following brushes are necessary:

Bristle brushes, "Super," for fresco and scene painting—¼ doz. of each, Nos. 1 to 6, round; ¼ doz. of each, Nos. 1 to 6, flat.

"Extra"—½ doz. of each, Nos. 12 to 24, round; ½ doz. of each, Nos. 12 to 24, flat.

Liners—¼ doz. 1 to 6, flat.

Flat bristle foliage brushes—¼ doz. of each, 1-inch, 1½-inch, 1¾-inch, 2-inch.

"Bristle Liners," for fresco and scene painting—flat, red, polished handles, tin ferrules—¼ doz. of each, ½-inch, ⅝-inch, ¾-inch, ⅞-inch, 1-inch, 1¼-inch, 1½-inch.

Bristle brushes, "Extra," twine bound—¼ doz. of each, Nos. 1 to 6.

"Super Extra"—¼ doz. Nos. 1 to 6.

"Extra Extra"—¼ doz. of each, Nos. 1-0 to 4-0.

Special bristle foliage, flat—1/6 doz. 3-inch, 3½-inch, 4-inch.

Round bristle foliage, long stock, wire bound—1/6 doz. of each, No. 1, 1-0, 2-0, 3-0.

COLORS

Use "Monogram" Fresco Colors in distemper, which are put up in 1-lb. jars and 5-lb. and 10-lb. cans.

Browns: raw and burnt umber, Vandyke brown, raw and burnt sienna.

Blacks: ivory black, lamp black, blue black.

Blues: ultramarine blue, Prussian blue, cobalt blue, Italian blue. Riviera, or night blue, for scenic artists; Antwerp blue, Milori blue.

Yellows: chrome yellows, L., M., & D.; yellow ochre, golden ochre, Dutch pink, ultramarine yellow, chrome orange, Milori yellow, Naples yellow.

Purples: ultramarine violet.

Greens: chrome green, L., M., & D.; emerald green, Milori green, M. and D.; L. & D. Antwerp green.

White: flake white, Cremnitz white.

Reds: turkey red, L. & D.; English vermilion, L. only; Venetian red, permanent crimson, permanent scarlet.

Lakes: carmine maroon, maroon lake, geranium lake, carnation lake, rose lake, rose madder, mauve lake, violet lake, rose pink, carmine lake, green lake, magenta lake, scarlet lake, Solferino lake, yellow lake.

All of the above colors can be obtained in the dry state, which is advisable when extremely large quantities of color are to be used. They are to be ground in the mill, using clear water only.

Use bolted whiting for priming, "pot colors," and for a general white. Reserve the flake white for small masses and "palette white."

THE BINDING MEDIUM

The medium for binding distemper colors is known as "size," or sizing. For making it, gelatine is much preferred, although the best grade of White Cabinet glue answers very well and is most commonly used. Drop four or five pounds into the caldron, cover it with clear water, and fill the water vessel two-thirds full of water. Apply the heat, and when the glue is melted you will have extra strong size. One dipper full of this strong size with four dippers of clear hot water will produce working size.

To test its strength after thinning (and while hot), dip the fingers into it and press fingers together for a few seconds. If, on endeavoring to separate them, they adhere ever so little, the size is properly thinned. If the fingers adhere quickly and rather firmly, it is too strong and wants a trifle more thinning with hot water. If, on the other hand, the fingers separate quite freely, the size requires to be made stronger by adding a little more of the extra strong from the caldron. A little practice will make it easy to gauge it just right. Glues vary a little each way as to

original strength, hence the test must be resorted to in order to compel the size to be uniform in strength at all times.

If size is too strong, your stretch will have a shiny appearance and the general effect will be marred; and if too weak, the color will rub up, rendering the stretch unfit for use.

Sizing must be used hot, or at least warm. When it gets chilled or cold it will "jelly" and must be returned to the caldron and a fresh supply taken. This applies to your "size pan," which you use and keep clean (as to color) upon your palette. Your "pot colors," which have been bound with working size, you can warm on the top of your stove.

Mix fresh size every day. If half an ounce of carbolic acid is added to every four gallons or strong size it will retard decomposition.

In hot weather, let the "pot colors" settle, pour off sour size, and renew with fresh.

If you are working in a small way, mix your size in small quantities, one gallon or so at a time, and you will have very little difficulty with decomposed size.

V

PREPARING THE CANVAS

For the canvas, use decorators' cloth, which can be had two yards wide, or any of the strong unbleached muslins two yards wide. Decorators' cloth can also be had three yards wide, which is the width to be preferred, as it reduces the number of seams in the stretch. Be sure to have the seams horizontal on the painting frame.

Have the frame fit the stretch as near as possible, leaving but little selvage on the edges. Start straining, or mounting upon the frame, as follows: Tack along the top of frame, beginning in the center and strain moderately tight each way to the corners, stopping within a short distance of them. Proceed likewise with the bottom of the canvas, and then strain and tack the sides in like manner, being careful not to strain too tightly (the strong sizing does that), and then finish tacking the corners, working both ways until the extreme corner is reached. This method will insure smoothness, and the canvas is then ready for sizing or priming.

In many studios sizing has been dispensed with, and the canvas is simply given a priming of strong size, with enough bolted whiting stirred into it to give an opaque surface to the cloth when dry. If sized and then primed, there is a tendency to get too much body on the canvas, which is bad. The lighter the body,

the better the wear, and it is also less liable to checking, which is, above all things, to be avoided.

For the prime, heat some of the strong size and thin it with one dipper of clear water to three of size. Stir in the whiting, and with a kalsomine brush apply it to the canvas, commencing at the top of the frame and working crosswise from one side to the other to the depth of about two feet. Keep the canvas tolerably well soaked with the priming, and allow no "holidays" to creep in. (Holidays are parts of the surface that escape being covered with the priming.)

Continue thus until the bottom of the stretch is reached. The work must be done rapidly and it is best to have two assistants on the priming of big stretches.

Note.—Keep a large quantity of bolted whiting soaking in water, and when some of it is wanted, pour off the water and knead the whiting with the bare hands to get all lumps out, after which it is ready for admixture with "pot colors," priming, or palette use.

In priming, work with well-charged brush and lay in the priming, working the brush flat, stroking in any direction. Do it quickly. Then rid the brush of surplus prime, by lightly batting it against the inside of the pot, and feather-stroke vertically; and finish or lay off by feather-stroking horizontally. This must be done very rapidly or the color or prime will "set" ahead of the lay-in, producing badly piled laps which cannot be removed. If priming is handled as advised, no trouble will be experienced, and when it is dried out it will present a smooth, uniform appearance. *Keep the priming hot,* which is the last word in the preparation of canvas for scene painting.

"DRAWING-IN" ON THE STRETCH

Primary.—Tie a bowline in the end of a chalkline; also provide it with a hook in the same end, which can be quickly made from a common safety pin by bending the pin in the middle back to the eye with a pair of wire pliers, cutting away the side of the pin which will be found useless. Make it fast to the line by passing the line through the eye of the pin. The pin will be found handy, as it enables the artist to set the end of the line anywhere on the stretch, independent of the frame or the use of an assistant to hold it at the point wanted. The loop or bowline is for the purpose of hooking over a nail driven into the "mounting edge" of the frame at the point wanted; also to slip over the nail of the long stick when reaching high points on the frame or stretch, without having to lower the frame to do so.

The Bow Snap Line.—This is a most convenient implement and is made as follows: Take a pine strip 1 inch by 2 inches, and to each end securely fasten short tapering pieces of hickory bent

"Indian-bow" fashion. Stretch a snap line tightly from end to end and it is ready for use. To use, merely chalk it and hold in position with a slight pressure, grasping it in the middle. The pressure exerted will stretch the line even tighter. Then snap, by picking up the line and letting go of it.

Procedure.—All stretches must bear a preliminary horizontal and a vertical line, intersecting each other at the exact center of

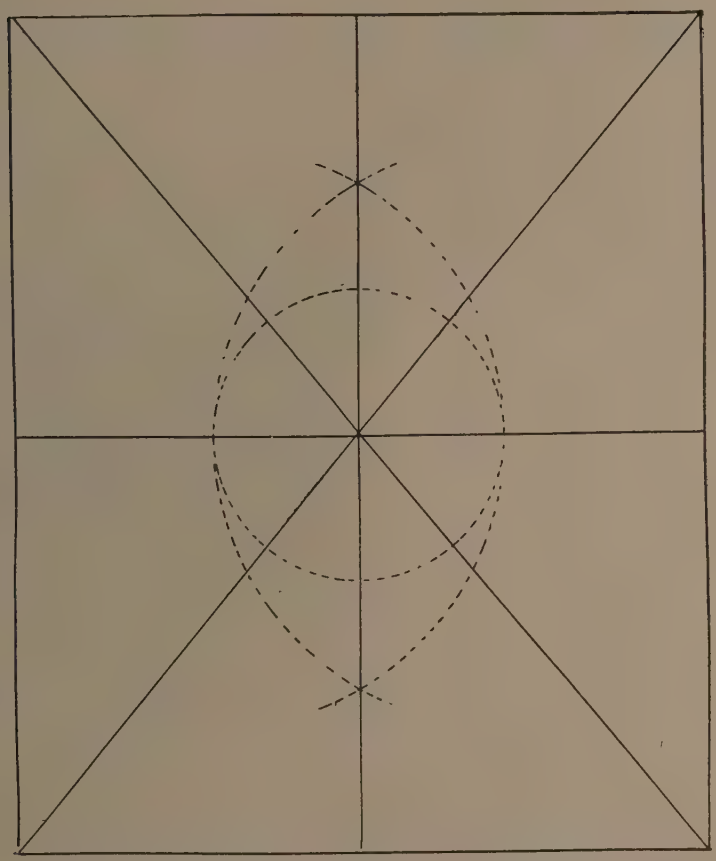


Figure 40.—Preliminary Sketch to Find Center of Stretch.

the stretch, determined as follows: Pass the snap line over the nail of the long stick; charge with coal by letting it glide over a piece of charcoal held in the hand, while walking backward. Have assistant hold end of line at upper left-hand corner (at point of long stick), and draw it taut to lower right-hand corner. Snap. Then have him hold the end of line to upper right-hand corner and draw taut to lower left-hand corner. Snap. Where the lines bisect will be found the exact center of the stretch. Get the exact

measurement of the center point from the bottom of the frame and indicate the point at the extreme left and right of the stretch, which would be on the mounting strip. Snap from point to point, which will give a temporary horizontal line, or permanent, as the composition may dictate.

Now we must establish a vertical line, proceeding as follows, See Figure 40. To left and right of center on the horizontal line indicate with point of charcoal crayon a point four or five feet distant from the center point. Now hook the pin end of the snap line at this point; hold small charcoal crayon between the thumb and forefinger of the right hand, with the palm of hand upward, crayon pointing outward from the body. Tighten the snap line with the left hand across to the other four-foot mark, and at this point grasp the line with thumb and forefinger of the right hand, at the same time holding fast to the crayon without altering its position, and you will find yourself holding crayon and taut line together between thumb and forefinger. Then, keeping the line taut, swing a curve on the stretch both above and below the horizontal line. Remove the pin and hook it at the opposite point and describe a curve as before. The two curves should intersect each other at top and bottom, and a line struck through these points will be the perpendicular required.

The canvas now bears the two important lines—a horizontal and a perpendicular. From these lines all other lines will have to be measured.

VI

THE MODEL OR SKETCH AND THE SKETCH ROOM

No scene painting is attempted without a model or sketch, and for complete sets of scenery a miniature stage setting is created on a scale of an inch to the foot or half inch to the foot. It should be of four- or six-ply Bristol board, and is built showing the proscenium opening or arch and the full depth of the stage, with the front or main drop curtain, back drop, and all intermediate drops, wings, and set pieces in their true positions, and the entire model rendered in full color. Also the "borders" must be shown.

A *sketch room* for the production of sketches and complete models is the most essential of all the studio's equipment.

Partition off a small room in the corner of the "L"—six feet by twelve feet will be large enough. Install an adjustable

drawing table, and provide one box of No. 810 thumb tacks, one-fourth pound Hardmuth's pink "pliable" rubber, half dozen Faber's pencil erasers, No. 111, a supply of Koh-i-noor lead pencils, one-fourth dozen of each, 8H, 3H, HB, and 2B; one small sponge, one quart Carter's mucilage, 5-ounce glycerine, one set of extra large water color brushes, one set Ord. "Albata," 1 to 7, assorted; one set red sable "Designers," 1 to 6, round, and 1 to 6, flat.

Also one set of German silver drawing instruments, one triangular scale, one mahogany T square with amber edges, 36 inches long, one transparent triangle, one oblong porcelain palette, one porcelain color slab, and one small palette knife.

Duplicate your color list in Bourgeois' French moist water colors; they come in small glass pots. Also duplicate the color list in Watson's Monogram Fresco Colors, and add one bottle each of Higgins' Waterproof India Ink, black, scarlet, green, and blue.

Also provide one pint of LePage's glue and a small jar of library paste, one-half dozen sheets of blue carbon paper, one quire tracing paper, Imperial brand preferred, 20 inches by 30 inches; one quire "Double Elephant" H. P. drawing papers, and a few dozen 6-ply Bristol boards.

A small footpower scroll saw will be a great convenience for cutting out and profiling borders and set pieces as they occur in the model.

The sketch is executed upon the drawing board and afterwards mounted upon a Bristol board (each piece in the whole setting being treated the same way) before assembling. To assemble, do the necessary cutting out and erect and fasten each piece to piece with small blocks of white pine and Le Page's glue.

Note.—The mucilage is used for binding the fresco colors. Use 6 parts glycerine to 36 parts mucilage.

VII

SCALE DRAWING

The "scenes" in the setting must, however, be arranged so that they can be easily removed, as each individual sketch must act as a working model or study for its reproduction on the actual curtain or stretch, and here is where *scale drawing* is resorted to in the following manner:

We will suppose the drop to be 24 feet wide and 20 feet high, and the sketch drawn a half-inch to the foot. Divide the sketch into 1-inch squares, dividing it accurately with the aid of your dividers. After division points are established, proceed to rule the divisions with lead pencil, T square, and triangle, making sure that the sketch is thumb-tacked squarely to your drawing board.

Now you will proceed to divide your stretch into 2-foot squares and snap the horizontal and perpendicular lines to correspond with the lines of scale on the sketch. Number the spaces on the sketch from top to bottom and from left to right, and repeat the numbering on the stretch. Strike in all the lines of the composition as shown on the sketch, Figure 41.

Draw in *square for square,* it being next to impossible to go wrong, as the numbers at side and top edge act as guides through-

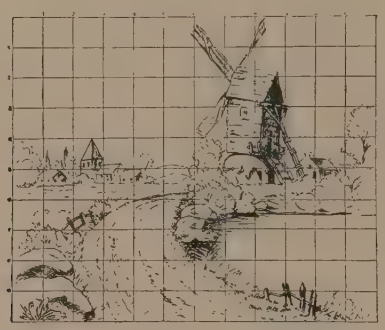


Figure 41.—Sketch for Scenic Stretch.

out in locating any square and the portion of the drawing therein contained. Figure 42.

When drawing-in is completed in charcoal, proceed to "ink" the whole drawing with thin wash of aniline color; Italian blue or deep turkey red will do, and if there is much small detail in the drawing, use an indelible pencil. Do not forget to *size* the color used. After color is dry, which will be in about ten minutes, dust off the charcoal with the "cat-o'nine," which will leave it clean and ready for painting.

On landscapes and figures, ornament, etc., it is good procedure to take a stain of raw sienna mixed with working size, and wash in local values, strengthening the stain for shadows by the introduction of *Vandyke brown stain* in the lowest shadows. By omitting the sky (if landscape) you will have the entire composition in an agreeable monotone, and if the laying-in is not too heavy, which is to be avoided, it will partially strike through and impart a pleasing tone to the entire painting.

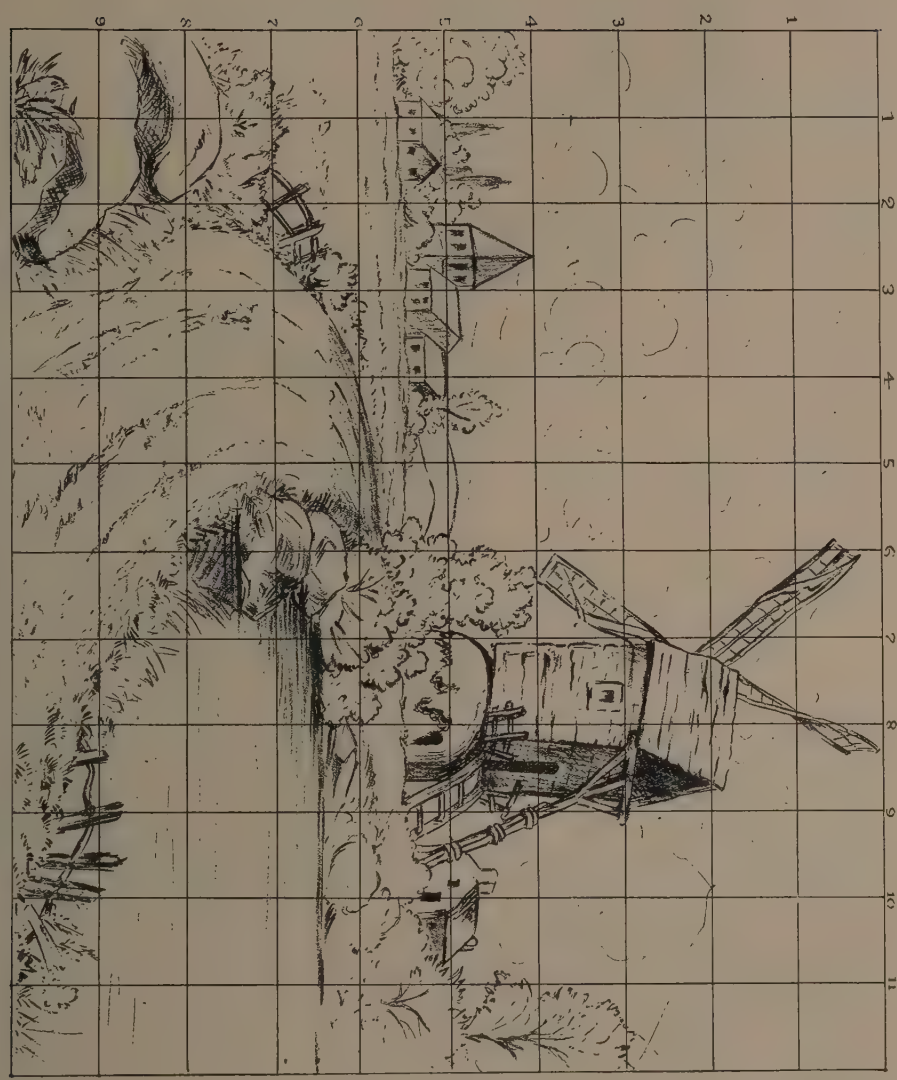


Figure 42.—Sketch for Scenic Stretch Sealed and Drawn In.

VIII

MIXING COLORS, LAYING-IN, AND PAINTING

Mix such pot colors as are required, and refer to sketch to establish their hue and value.

Mix first the deepest sky value, using either of the blues with whiting. Take two pots; mix some whiting only in one and raise to the highest or lightest blue found in the sky. Mix a gray composed of ultramarine, Venetian red, a touch of Prussian and light ochre, and a preponderance of whiting, or enough to make it a rather deep neutral. This color is to be used sparingly in the lowest values of the clouds and for admixture with all gray values and tints which require to be "grayed." For local tone of clouds, use the foregoing gray in white, tinted slightly with orange chrome and carmine lake; the resulting color should be a light, warm tint which will act as a tone, using *it* instead of white for mixing all "high values."

See that all pot colors are sufficiently sized before use in laying-in, taking care that they are of the right consistency, not too heavy or too thin. They should cover well, without a thick or heavy deposit of color film.

The above series of laying-in colors will be sufficient for an ordinary landscape if quite simple in composition.

All laying-in colors should be mixed with size that is a little stronger than working size, for you may have to go over the same spot several times before your scene is finished, and the surface would become spongy and inconvenient to work on if this precaution were not taken. It would also be advisable to "size in" all spots which have not been covered with the raw sienna monotone wash, using working size with just enough whiting in it to give it the semblance of milk and water. This will greatly facilitate the laying-in, and cause the colors to blend and soften far more readily than would otherwise be the case—an object much to be desired, especially in laying in the sky.

SETTING THE PALETTE

You will now proceed to "set," or load, your palette trough with a small quantity of every color listed. Arrange the reds in a group from lowest to highest, and group the yellows and blues the same way. Also place on the palette a pot of water-soaked white and all pot colors previously mixed, and a pan of working size, with an extra dipper of strong size or "half-and-half," as it should be called; and lastly, a pan of clear water for brush wash-

ing, and a few clean pots for the mixing of intermediate and other tints from those already made up.

When the laying-in of the sky is started it must be carried on as rapidly as possible, starting at the horizon and working upward from lightest sky tint to the local sky tint, keeping the sky tints loose and scumbly around cloud formations. After this, proceed to lay in the cloud formation rapidly, varying the values and hue by "brush mixtures" from the palette. If foliage, peaks, or buildings silhouette against the sky, disregard them, as the aniline color used in inking in the drawing will strike through any of the sky that is loosely carried across the object. Give free play to a large brush on skies, so that the form which the outline of the clouds will ultimately assume may depend, to a certain extent, on chance.

The main thing in laying-in sky is to keep the section devoted to sky *wet*—not wet enough, however, to run, for that is not the meaning of *wet* in scene painting. It must emphatically be borne in mind that distemper colors dry rapidly, and the aim is to produce the effects desired or dictated by the model before the color begins to set or dry out. If this occurs before "effect" is reached, recourse must be had to after painting. Hence it is more satisfactory if the sky can be laid in and finished at one and the same time, rendering it so rapidly that dry-spots will be impossible. This accomplished, an atmospheric effect is produced which is rarely attained by any amount of after-painting.

If the sky is all that could be desired, complete the laying-in of the whole scene, beginning with the extreme distance in purple grays, using the light sky tone in the mixture of the values. Lay in all the masses as they occur, working toward the foreground and diminishing the quantity of tonal gray as the foreground is reached, making use of purer color values.

THE SECOND PAINTING

In the second painting the effort is devoted to strengthening shadows of objects, introducing additional values to local coloring of the same, which will bring them into proper relation with the *key* established in the first painting or lay-in.

These additional color values and hues are brush-mixed upon the palette, and some will be opaque while others will be glazes, and some effects again will be introduced by scumbling with opaque color. This will terminate the second painting.

THE THIRD PAINTING

The third painting comprehends additional overlays of still richer values in the form of crisp high lights, reflects on the shadow sides of objects, cutting up with accents in deep, strong values, and intensifying all detail in agreeable artistic touches.

ROLLING AND HANGING CURTAINS

This brings the painting to a conclusion, and when dry, draw all of the tacks along the bottom of the frame and up both sides, then carefully slide a 4-inch diameter wooden roller into the "roller apron" at the bottom, which is stitched in at the time the seams are run. It is almost needless to say that the roller apron must be absolutely straight and in the square of the curtain, which was in turn mounted square on the painting frame.

Range as many assistants as possible along the roller, leaving one assistant to lower away at the hauling line. Let them then, all working in unison, roll the curtain on the roller, keeping it moderately tight. When you come to a seam, see that it is parallel to the roller; and if it is not, loosen or tighten the cloth at either side, as the case may require; otherwise you may find the cloth two or three feet out by the time the curtain is entirely rolled.

Take great care that no folds or creases arise while it is being rolled up, for it would be impossible to get rid of them when once they have been allowed to form.

Also note that the roller ends must project a few inches beyond the edge of the curtain at each side, if it is to slide in vertical cables when in position in the theater. This is the customary way to hang scenery in all houses having roomy "flies," or scene loft.

In smaller theaters in which no "flies" exist on account of lack of room, the scenes must be hung to roll up from the bottom by means of halyards rigged as follows:

Hang the curtain by passing a full length gaspipe into a pocket at the top, and support by driving heavy "sign hooks" into a beam (a sign hook is a slender, tapering hook with the outer end also tapered, and turned up at right angles—made in various sizes for sign hangers). The roller for the bottom must be of quite large diameter, seven or eight inches, with apron to accommodate it. Then securely hang a single and a double tackle block three or four inches to right and left of the curtain at the top. Have the double block on the side or end where the hauling position is taken. Fasten $\frac{3}{8}$-inch manila rope to outer or extreme end of the roller, and take enough closely laid turns of the rope around the ends, winding opposite to the way the curtain is rolled. Pass the ropes up and through the tackle blocks. The far halyard will pass up and through the single block and horizontally across to the double block and downward to cleat; the near halyard will pass up and through the double block and back down to cleat. If enough turns have been taken on the roller, the curtain will rise by hauling on the halyards, going clear of the border, and when lowered, will automatically rewind as the curtain unrolls downward to stage.

Roll curtain face outward, if it is to be of the rolling type.

IX

GENERAL HINTS ON SCENIC COLORS

A good, quiet, general tint may be obtained by mixing Dutch pink with black, Prussian blue, or blue verditer. Light ochre with green lake or emerald green gives a rich green, and may be changed into a cool green by adding Prussian blue or indigo. Cool greens should be supported by a rich underlying ground of raw and burnt sienna and Vandyke brown. For vivid, crisp, high greens, use ultramarine yellow or lemon chrome yellow, a little Dutch pink and emerald green; and orange chrome, Dutch pink, and lemon chrome for warm foliage in the local color values, keyed high or low as dictated by the subject.

It must be fully borne in mind that these hints on color are to be taken in a general way and are irrelevant as to hue and tone, which are entirely governed by the key, subject, and model. And it may be well to mention here that scenic artists as a rule develop their own method of rendering and technique, and reach results by different routes. For example, on a sylvan scene, some at once lay in large masses of the different greens, both light and deep values, and afterwards, with deep values of greens, purples, and deep rich browns, proceed to accent and give to the whole mass or masses definition and form; finishing the mass or masses with a few well-directed, crisp high lights; while others lay in the deep greens and transparent browns and delineate trunks and branches at one and the same time, following with the foliage masses in local and shadow values, cool and warm, and finishing with touches of high light and accents in the shadows.

Resuming color hints, use black, Venetian red, and white for a good standard gray, which can be altered by the addition of other colors, up to any tone desired. Rose pink, ultramarine blue, and white form a good purple, suitable for independent use or with other colors. A good brown will result from brown ochre, Venetian red, and black, with a trifle of white or light gray neutral.

Gold color can be mixed in various ways. Golden ochre is a fair gold color alone, when used as the local for lay in. Brown ochre, with a little Dutch pink, and Vandyke brown and the same with burnt sienna, all produce good laying-in for gold.

For high lights use flake white added to lemon or orange chrome, lemon chrome straight, or orange chrome with lemon chrome or Dutch pink. For shadow, use Vandyke brown with brown ochre; this can be warmed with burnt sienna, which will also raise the value a trifle. Mix a purple from ultramarine blue, rose lake, and a trifle of white. The reflected lights in the shadows will require orange, with a trifle of pale English vermilion and Dutch pink with a very little burnt sienna.

The foregoing simply applies to the treatment of general gold ornament, etc. When the gold is near or laid upon any strong hue, the reflections must partake of that color.

Caution:—All purples, regardless of value, are prone to appear too red under artificial light, and to counteract this tendency, the quality of all purples should be rather *too cool* when viewed in daylight.

Following this suggestion, purple objects should be laid in in cool purple values and shadowed in warm, low purples, or the reverse—warm local purple and cool shadow.

On purple drapery, lay in with ultramarine and white, with enough scarlet lake to give it a purple quality without getting it too red; merge into the shadows with scarlet lake and the local purple, while the deepest shadow can be glazed with scarlet lake, and a touch of ultramarine in strong size.

To lay in red drapery, begin with light and deep Turkey red, with maroon and Vandyke brown for shadow, which can be rendered in one operation; leaving the high lights to be scumbled or dragged in, using rich bright red, pale English vermilion, with a little light Turkey red and geranium lake added to impart the rich quality. The reflected lights can be almost, if not entirely, introduced in the laying-in operation, if a little clever handling is resorted to.

Always bear in mind that shadows can be strengthened or deepened by the glazing method. And again remember that in laying-in much can be accomplished in general distemper painting if the local values, shadows, and reflections are introduced at the same time; this will lessen the amount of after painting and it is possible to do much blending and coaxing in the laying-in, which cannot be indulged in subsequent painting.

If any softening or blending is to be accomplished in the after painting, scumbling or dragging must be resorted to, in a greater or less degree in proportion to the result or effect attained in the lay-in. The use of short bristle brushes is recommended for coaxing and teasing edges of planes together when laying in, as the tendency to "pile" color is lessened,—which is bound to happen if long bristles are used. This suggestion is almost entirely applicable to figures and comparatively small objects. It is easy enough to control large masses and soften their edges with any brush on the palette.

On sky and other gradations it is well to mix all the values, giving to each the requisite color quality, and have them all in pots from the highest to the lowest, taking samples of each and drying them out to make doubly sure of the value and color. Doing this may save a lot of disappointment through the stretch turning out badly.

To render a *gradation,* proceed with the first value in the series and lay in a strip or plane rapidly. Lay in the next as

rapidly as possible, and soften the edges or blend them; and then lay in the next and blend the contact. Repeat for each value until the gradation terminates in the last value of the series. It must be rendered rapidly or a failure will result.

And it must be borne in mind that distemper colors change greatly in value as they dry out, especially those carrying white in the admixture, which dry lighter or higher in value. Greens and browns have a tendency to deepen in value when dry, if no white has been used in their composition, and it follows that only intimacy and a constant association with "scenic color" will overcome the embarrassment incident to first attempts.

However, the student must not let a few failures discourage him. True "color deductions" will come with experience, and unless color trials are conscientiously persisted in, and in connection with the study of the procedure set forth in this manual, your progress cannot be other than slow.

Right here the author wishes to impress you with this very important observation relative to your advancement in scenic art. *You will advance if you are persevering* and will study this manual seriously and practice drawing and painting during leisure half-hours that might be spent less profitably.

Further, do not let your first modest successes turn your head. These should only encourage you to greater effort. And do not, upon the first flush of genius, apply at any large studio for admittance to the staff as a scenic artist. The author would not want you to suffer the humiliation that you would be compelled to endure when you failed utterly on your first stretch.

Rather, if your inclnation takes you to a big studio, join the staff as a "junior" or apprentice. Your talent and knowledge will show quickly enough, and advancement will follow rapidly enough—too much so, if you are too eager. The path upward is full of pitfalls and failures.

In a big studio you will have a chance to show your ability on "kitchens," prisons, simple "wings," easy borders, advertising drops, etc., all or any of which will give an abundance of opportunity for the display of latent or developed ability.

Also please bear in mind that this manual, as you find it, does not assume to go beyond procedure, setting forth only in a practical way the methods in vogue with scenic artists, especially on "color." The "color" given is only approximate and is so suggested, but with the aid of the chapter on values and key, part I, it will be more than sufficient to give you a very literal interpretation of color.

ART REFERENCE

The above is a term that is aptly applied to anything of an artistic nature that can be used as a model or study. There has been no intent to introduce any "art reference" in this work.

This manual is purely and simply a treatise upon the practical phases of the Art of Painting; embracing drawing and the academic principles of color, in the Educational Division of the book; while in the Scenic and Bulletin divisions, procedure, method, and equipment are considered.

When you begin to gather and accumulate a reference library, the limit is only confined by your desire and enthusiasm. You can go as far as you like; many scenic artists have expended upwards of $3,000.00 on their libraries and are still in the market for more.

G. Broes VanDort, Chicago, Ill., can supply almost everything in the way of art reference. He is an importer and caters to decorators, scenic artists, commercial artists, mural painters, and architects.

For a starter, the author recommends: "Complete Vorbilder," "Modern Decorative Art (Italian)," and Owen Jones' "Grammar of Ornament." This will do for a start and will cost about $200.00.

SCUMBLING

To "scumble," take a 1½ or 2-inch flat brush and squeeze it dry; then brush mix on the palette the color required, and have it quite heavy in body. Charge the brush with this and stroke lightly over the surface, laying it sidewise against the canvas. The effect of the scumbling will not be apparent until it is dry, when the work over which you scumbled should be visible through it. This technical trick answers admirably in cases where it is required to represent mist, smoke, spray, and the like.

Scumbling one color over another has a good effect also in cases like the following: Suppose the coloring of crag or rock, for instance, has too warm a tone; then, by scumbling over it with some cool color, you would obtain an effect which you might try in vain to produce by other means. Or, by scumbling over what is intended to represent a rough stone, for instance, by blotching here and there with more color than is shown in the rest of the stone, a texture is produced which could not possibly be arrived at in any other way. Scumbling can be successfully performed with any color, any value, on any surface, and even after glazing.

DRAGGING

Dragging resembles scumbling. The brush—which should be a large, flat one—must be charged with the color and worked "dry"; that is, the brush is stroked over a burlap pad, ridding it of its free flow of color. Lay the flat of the brush evenly and draw lightly over the canvas.

Dragging serves many purposes. It is a very good method, for instance, of representing the effect of the angular rays of the sun or of the moon streaming in at a side window. These rays

may be dragged across the underlying color, which can be seen through the dragging. By this means, also, may be represented the pretty effect of the rays of the sun or moon diverging through and over the clouds, but extreme care must be taken to render them straight.

THIN COLORING

This is a process which may be employed with success when it is desired to impart a better feeling of atmosphere in the distances of a landscape, when the distances have been handled a trifle too strong or colorful. "Pot mix" a pale, neutral gray and cast it to purple gray; thin very thin with working size and a little water; charge a large brush with as much of the "wash" as it will carry without dripping, and apply it quickly to the distances to be grayed.

It requires a great deal of dexterity to "thin color" successfully, and it would be well not to venture it without previous practice on surfaces that you have reserved for experiment. Great care must be taken not to "dry lap" thin coloring, as, no matter how thin it is, the lap will show an opaque streak, and will absolutely spoil the effect.

GLAZING

Glazing is very much resorted to in scene painting and can always be employed with agreeable effect. Its greatest utility consists in the rich tone it imparts to color when employed judiciously and in a clever manner. To make this point clear, try laying in pale English vermilion and glazing it with any one of the rich red lakes, notably carmine, red lake (proper), scarlet lake, geranium lake, rose madder, etc., mixed with a little strong size. Apply the glazing when the lay-in is perfectly dry.

The same glazing colors would cause orange to become very much richer in color quality. Also bear in mind that glazing becomes a very important factor in lowering and strengthening the lowest or deepest shadows, which occur in "low keys" and the recesses of a cavern or dark chamber, deep sylvan shadows, etc. —the glazing of which can be accomplished with Vandyke brown and burnt sienna, which will produce the required richness and depth hardly obtainable by any other means.

For glazing purposes, a little strong size must be added to the working size, and the deeper and stronger the glaze is desired, the stronger the size must be. It must not be strong enough, however, to impart to your color the shiny or crystallized appearance, which is to be avoided as you would a pest. A little practice will enable you to determine the proper strength for glazing size.

The best of all size for glazing is glue size, and can be improved by adding a little molasses, which renders it more adaptable for a dark, strong glaze, and, to a certain extent, prevents it

from shining when dry. The molasses also prevents "cracking," which is a very serious drawback to successful glazing in distemper, and must be studiously guarded against, especially if the underlying color is heavily applied and bound with a too weak size.

When a rich, luminous effect is desired in a sunset, lay in the sun in flake white, after sky and clouds have been rendered, and after it is dry glaze with orange, vermilion, and lastly carmine, or any of the rich red lakes, allowing time to dry between each glazing. Glazing can be employed whenever stained-glass windows or other transparencies are prominent notes in a scene.

X

ARCHITECTURAL PAINTING

Before entering upon this branch of scene painting, the student should endeavor to acquire a general knowledge of architecture, sufficient at least to render him familiar with the distinguishing peculiarities of the different orders and styles into which architecture is divided, together with the rules that prevail in the science and to which he will have to pay the most scrupulous regard at all times.*

The sections on Perspective in the Educational Division of this work will enable the diligent student to draw successfully any architectural subject in true perspective. As heretofore stated, this work, being limited to practical procedure, does not embrace any art reference, and the author will again refer to G. Broes VanDort, 20 Jackson Boulevard, Chicago, who can supply the student with complete architectural reference in the several styles and periods. But it is the intent and within the scope of this work to demonstrate by example the several means employed to attain certain results in scene painting and in perspective drawing.

When ready to start drawing in on the stretch, the first obstacle encountered, in most cases, is lack of space in which to establish vanishing points; and the difficulty is overcome by all professional scenic artists in the following manner:

In the first place, it is imperative that we have a sketch and, as heretofore stated, no scene painting should be attempted without one; and it must be ruled with scaling lines as explained in the section on Scale Drawing. Now, we will proceed to the example here shown in order to demonstrate how lost vanishing points are

* *The Five Orders of Architecture*, by Fred T. Hodgson, published by Frederick J. Drake, & Co., Chicago (price $1.50), is a good elementary book on this subject.

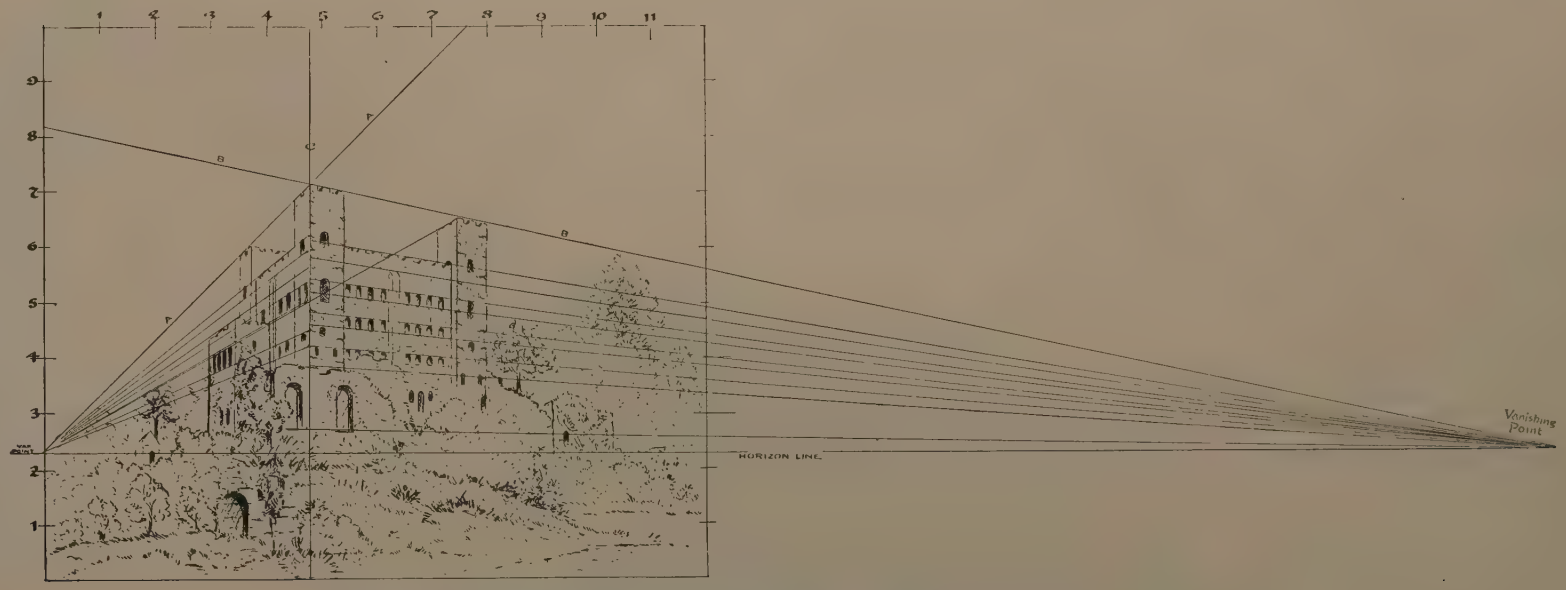


Figure 43.—Showing Architectural Composition, Vanishing Point Entirely Off Stretch.

located upon the stretch. True, we have them on the model, which was and is a very easy matter, for the reason that the sketch is small and there was plenty of space on the drawing-board for their location.

The example shown is a simple scene, in which the old castle is the feature or predominatng note. You will notice that the sketch is scaled and ruled, while the stretch has been simply scaled and numbered,—the ruling has been purposely omitted, so as not to confuse scale lines with lines of perspective.

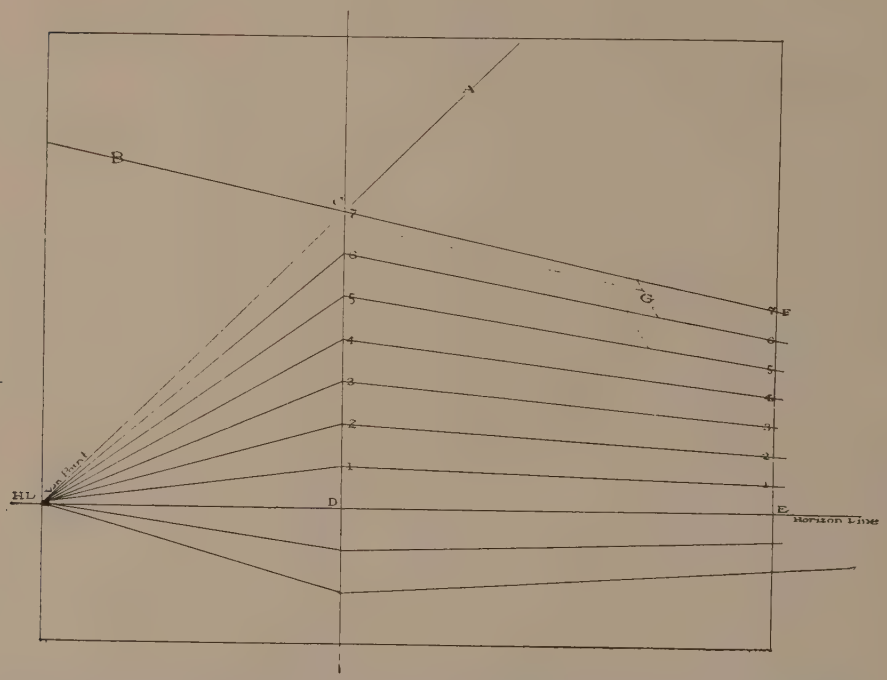


Figure 44.—Method of Establishing True Auxiliary Perspective Lines When Problem is as in Figure 43.

First, establish the horizontal line, which in the example is about one-third of a square above squaring line 2,—and then "strike" it all the way across the stretch.

You will perhaps note that in this case the squaring lines have been numbered, instead of the spaces or squares, which is an advantage in many cases, especially in architectural drawing, whereas in general drawing it is more desirable to number the squares.

Indicate the left-hand vanishing point on the horizon line, which will give us no bother on the stretch, as it is within the border limits of the stretch. The right-hand vanishing point will be the one that will cause the trouble, because it is entirely outside of the latitude of the stretch. Next strike the vertical line, which

gives us station point and the nearest corner of the castle, which is between squaring lines 4 and 5, nearest to 5. Now, at the top of the stretch, to the right of squaring line 7, indicate the point where the line A (which is the horizon of the left-hand series of planes) drawn from the left-hand vanishing point just found, meets the top edge of the sketch. Insert the hook of the snap line in the vanishing point, and strike this line.

Now determine where the oblique line B (which is the horizon of the right-hand series of planes) cuts the edge of the sketch, which will be a trifle above squaring line 8 on the left and between squaring lines 5 and 6 midway. Indicate it at the edge of stretch

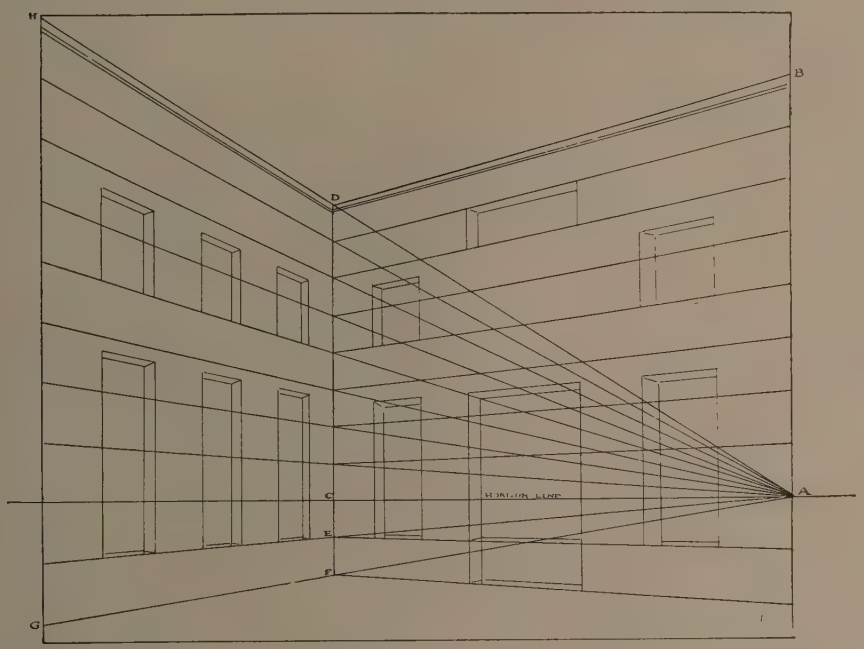


Figure 45.—Method of Establishing True Auxiliary Perspective Lines When Problem is as in Figure 43.

and strike the line B. These two lines, A and B, are the most important ones in the whole series of lines, and should therefore be very carefully and accurately established. The point C at the intersection of these two lines will give us the apex of the tower. All detail and lines in the left-hand series of planes can be drawn from this point, making use of the squares for actual guidance. In the right-hand series we will resort to the following plan to locate the vanishing point. Figure 45:—

Mark the intersection of the horizon and perpendicular line D, and then divide the perpendicular line from D to C into seven equal parts. Now, where the horizon and the line B truncate or

pass beyond the edge of the frame, we will mark these truncating points E and F; then divide the space on the edge of frame between E and F into seven equal parts; then we strike the lines between the divisions on the edge of the frame and those on the perpendicular line.

We now have seven true perspective lines which would, if continued, all meet at one point on the horizon, which is the vanishing point. It is almost unnecessary to add that all lines for windows, cornice, etc., must be struck to perpendicular line CD. Also it must be borne in mind that the divisional lines are not to be termed permanent lines,—they are merely *true perspective lines,* and are to aid in the location of the actual or literal lines of the drawing.

To demonstrate how thoroughly they fulfill their mission, we will consider the literal line of the cornice which occurs in the right-hand series of lines, and we will proceed to number the perspective lines from 1 to 7 above the horizon. Strike the cornice line on the left hand, from the left-hand vanishing point, and intersect it across the perpendicular line. Next, take a straight edge and hold it against the perpendicular line CD. Mark on it the points in which perspective lines 5 and 6 intersect C and D, also the intersecting left-hand cornice line intersection. Then move the straight edge, bearing the three marks on it, near to the end of the perspective lines at the right hand.

If you now hold the straight edge perpendicularly, as before, you will find that there is not space enough between the 5th and 6th lines to fit the marks indicated on the straight edge, in consequence of the perspective diminution. You must therefore angle the straight edge, as at G, until the indication marks of 5 and 6 on the edge register with the lines 5 and 6 on the stretch. Indicate position of the cornice line at the point previously marked on the straight edge, then strike a line between that mark and the corresponding mark on the perpendicular line.

Find all literal points and lines in the same way throughout the entire drawing. You will find a strip of paper much better than a straight edge, as it lies closer to the surface, making it possible to get greater exactness in determining literal points.

Should there be any objects in perspective below the horizon, the perspective lines can be established for them by dividing the perpendicular line and the edge of the stretch, below the horizon, into the same number of spaces, and proceed as before.

We will demonstrate the plan further by showing a simple interior where the same rule applies as in the preceding example, and we will find that results are similar.

Assuming that the sketch has been drawn in true perspective, making use of the two vanishing points on the horizon, we will proceed to the stretch and strike the horizon line across it, determining its location by reference to the squaring lines; and we find

the right-hand vanishing point locates itself at the extreme edge of the frame on the right-hand edge. Strike the plane horizons ADH and DB. Now, divide as before, the space AB, between the horizon line and the horizon of the plane, into equal parts, set off two similar spaces below the horizon line, and divide the corner perpendicular line CD into the same number of spaces, setting off two of them below the horizon line. Then strike lines between the points of division, as before, and through the parts in which the lines cut the perpendicular lines CD and EF, strike lines from the vanishing point A to the left-hand edge of the stretch from G to H, through the perpendicular line where the perspective lines cut it.

Both walls are now covered with true perspective lines, and such other lines as do not fall on any of them must be obtained by measuring between two of the perspective lines, and angling the straight edge or strip of paper as before directed and the entire drawing-in on the stretch will be under absolute control.

Note:—For windows and doors refer to Section V in the Perspective treatise, which will direct you how to establish "ground line" or "line of actual measures."

XI

STAGE PERSPECTIVE

Rules of perspective are often very much modified, or even rejected, in scene painting, and "stage perspective" is adopted, especially in the creation of wings or side scenes. In true perspective all lines must converge to a single vanishing point, or they must converge to a double vanishing point. But in scene painting it becomes necessary to violate the rules in order to avoid embarrassment in the result which would follow if true perspective rules are applied below the horizon line.

Stage perspective dictates that all lines below the horizon line be kept parallel to the stage floor and the horizon line. The reason for this is that the base line on the perspective side of the wing is supposed to rest on the stage itself, just as the base line of the face of the wing does; but, in consequence of the rules requiring that the base line of the perspective side should incline upward to the vanishing point, there would remain an awkward triangular piece of space which we could not utilize so as to make it match the stage, nor could we paint so as to make it appear a part of the base of the wing. Therefore, the only way out of the difficulty is to have all lines below the horizon drawn parallel, as here noted. Not that all wings are to be treated in this manner, but most, if not all, "interior wings" must form exceptions to the strict rule

of perspective. The little drawings here given will show how the standard rule has been deviated from. Figure 46.

CENTER OF TOWER OR TURRET—HOW TO FIND IT QUICKLY

Simply strike a perpendicular line midway between the outside lines that form the corners of the structure, as in the little drawing, which explains the step fully. It does not matter how much or how little of the planes on either side is shown, the same

Figure 46.—True Perspective Compared with Stage Perspective.

plan will always suffice; and the perpendicular so obtained will serve, on occasion, for a flagstaff or, when lengthened and joined at any height to the corners of the tower, for a spire. Figure 47.

THE DRAWING OF BORDERS

By way of example, we will represent a ceiling and do it with a set of three borders—compelling it to appear as in drawing Figure 48, the bottom edge of each being the line AA and the continuation of it the back edge of the bracket at each end of the beam.

Stage perspective will be called into operation so that the

borders must be drawn, not as in drawing Figure 48, but as in drawing Figure 49; because, when they are suspended in their positions, from three to six feet apart, according to the size of the stage, they will, to a certain extent, make their own perspective and appear as in drawing Figure 48.

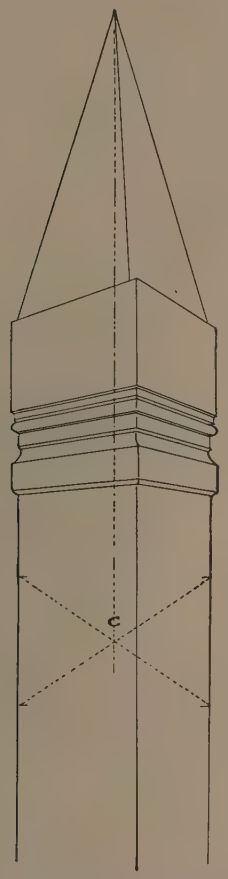


Figure 47.—Method of Finding True Center Regardless of Size of Plane.

Proceed in the following manner: Have border strips 4 feet by 30 feet, tack them down to the studio floor, and prime in the usual way. When dry, strike a line at the bottom of each border. Above this line, at a distance of 14 or 16 inches, strike another line, equal to the depth of the brackets. This line will form the bottom of the beam of each border. Now, take up the strips and prepare to tack them down again in succession, laying the third or back border first, and then the second over it.

Place the second border so that its struck line AA comes within 12 inches of the straight line AA of the third border, and parallel to it. Then place the first border over the second, with its

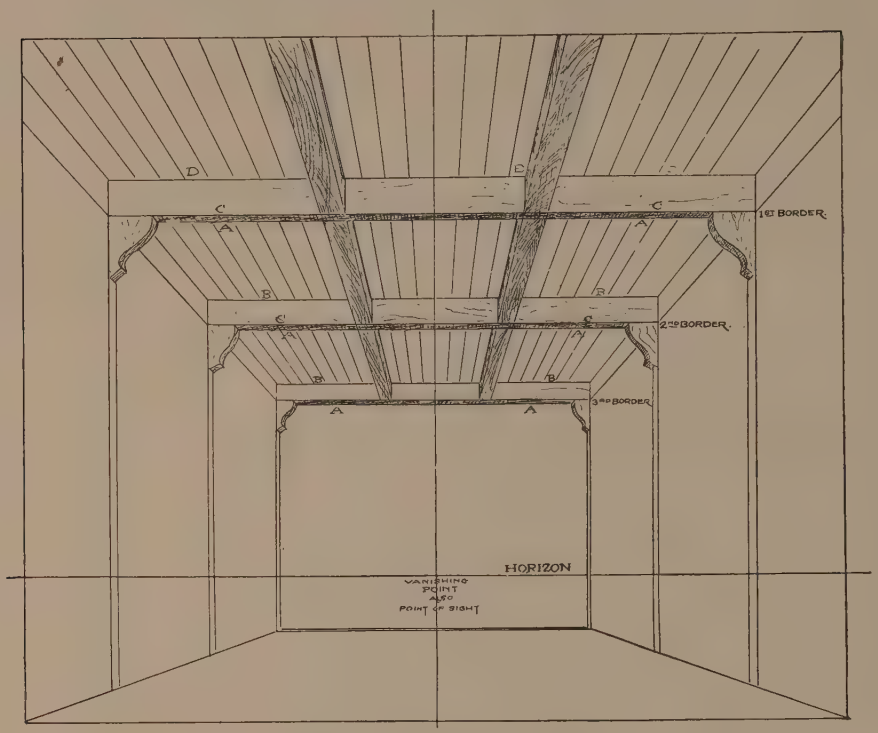


Figure 48.—Set of Borders.

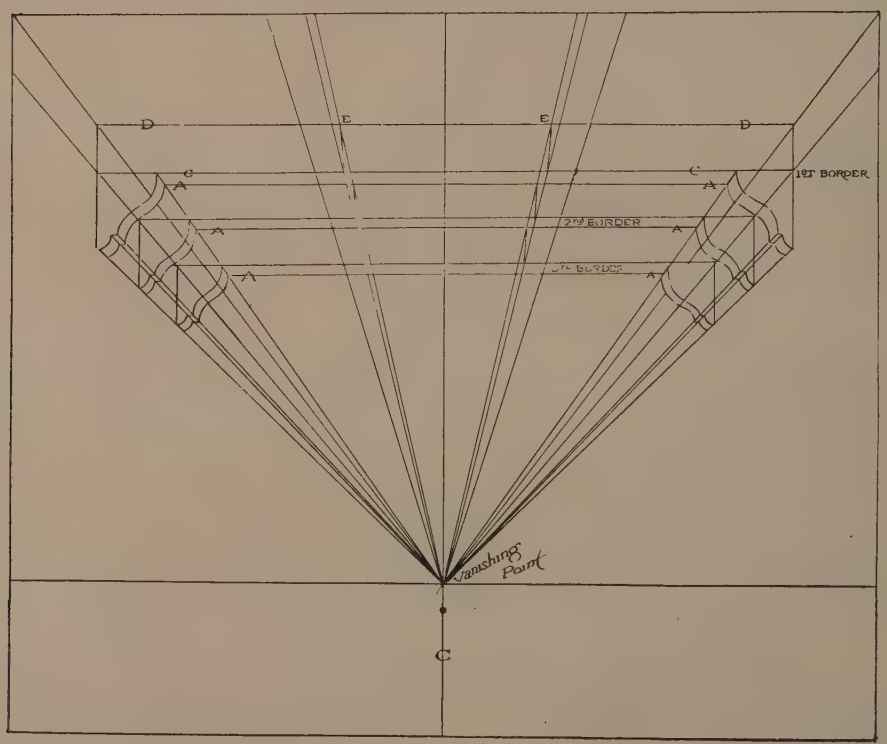


Figure 49.—Showing Shortening Procedure to Get Same Set of Borders to Appear as in Figure 48.

straight line AA 16 inches apart from that of the second, and parallel also. The bottom lines of the second and third borders are, therefore, nearer together by 4 inches than those of the first and second, which will give about the right diminution. Now find the center of the borders and strike a line perpendicular to the horizontal lines in each. Tack them down temporarily, to keep from shifting while drawing in.

The borders will hang about 18 feet from the stage when in position. We will, therefore, measure 14 feet from the line AA of the first border along the perpendicular line, and at the 14-foot mark we will drive a nail. This will be the vanishing point, to which we will fasten a long snap line ready for use.

Now get the length of the first border by means of the sketch drawn to scale, and complete the drawing of it, determining the distance between the lines AA and CC, and also between CC and DD, also how far the brackets project from the ends of the border. Making use of the snap line, draw in such of the lines in the brackets as proceed towards the vanishing point, striking through as much of each border as is exposed to view. Great care must be exercised while doing this, as it will be the only guide after removing the top border.

Our sketch, being drawn a half-inch to the foot, it will be easy to find the length of each border. Having then obtained by the scale the exact length of the second and third borders, rule down the perpendicular lines for the back edges of the brackets, which, as before stated, would be 14 or 16 inches, and then strike a line to the vanishing point. Measure, with the scale, how far it is from the center line CC to the intersection of the cross beam lines with the long beams, and also the width of each cross beam. These being found, rule the perpendicular line between C and D at E, and where that intersects the line DD, strike a line on each side of the center to meet the vanishing point, and that will give the perspective side of the cross beam.

The lines of perspective in the ceiling must be clearly struck across the second and third borders, each border having been previously drawn and "inked in" with Italian blue or any aniline color, to preserve the outline. The top border can now be removed, it having served its purpose. That done, continue all the vanishing lines through the space which the first border covered, and then draw the second in the same manner as the one removed. When this is finished, take it up and proceed with the third border. Remount back on the painting frames and render them in the key and style intended. When dry, cut out bottom profile of each.

ELLIPTICAL ARCH BORDER

This can be a piece of sky or can be filled with "grand drapery," or given a "pergola effect" in the opening and the spandrels can be filled ornamentally or left plain. Figure 50.

For example, we will create one 24 feet long and 8 feet deep. Allow 3 feet from top of border to the ellipse and allow 3 feet at each end, showing these measurements on the sketch drawn a half-inch to the foot. Proceed just as though you were going to strike a full ellipse. Assuming the bottom edge of the canvas to be the major diameter and a midway perpendicular line to be the minor diameter, take half of the major diameter and set it out to the extreme point of the minor diameter and then swing the "half major" across the major and at the point of intersection will be found the focal point. Repeat it on the other side, which will establish both focal points. Set a nail at each focal point and a temporary nail at the extreme end of the major diameter; then

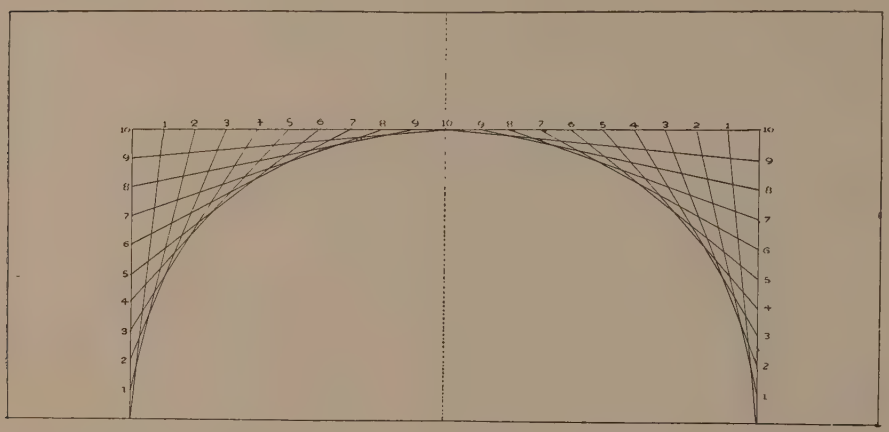


Figure 50.—Method of Quickly Determining and Drawing in an Arch.

pass a non-stretchable piece of twine around one focal post and the temporary nail and "tie-off," forming a loop in so doing. Then draw the temporary nail and insert an indelible pencil in its stead; and describe the ellipse by keeping the twine taut and moving the pencil forward at the same time.

The same ellipse can be accomplished in quite another way, by the following plan: First set out the outside lines of the border (top and bottom and ends). Then determine the height and width of the arch and strike the horizontal and perpendicular lines AA, BB. Now divide the side perpendicular lines into ten equal parts, as in the little diagram, and the horizontal line also into the same number of parts, proceeding from the side lines to the central perpendicular line. Next, draw a straight line from the springing of the ellipse at the bottom of the border to number 1 on the horizontal line; then from number 1 on the side line to number 2 on the horizontal line, and so on in succession, till number 9 on the side line is struck to number 10 on the horizontal line. The diagram will show the resulting curvature. On a lage scale, however, a series of obtuse angles will be shown. All that remains

to be done is for an assistant to bend a thin straight edge to the indicated form and then rule the line.

THE HORIZONTAL LINE

In scene painting, the horizontal line is a matter which requires a great deal of taste and judgment. Never set a horizon too high on the stretch, especially for interiors, street scenes or avenues. For an interior the section of the floor shown on the stretch in perspective, is supposed to be but a continuation of the stage itself; and if a high horizon is used, on interiors, streets, or avenues, the stage floor in the one case and its continuation on street or avenue in the scene will have the appearance of suddenly springing up at an angle of extreme elevation, so as to be very far from seeming to form a part of the stage. And the effect is rendered still more ridiculous, especially in the case of interiors, the moment the characters begin to make their appearance in front of the scene.

XII

INTERIORS

Modern interiors can be created with comparative ease by using wall papers, which every one knows can be obtained in endless variety and in any style and color.

Build a little model to half-inch scale, showing side walls and ceiling; break up the side walls into offsets to rid them of monotony; show all openings, such as windows and doors, and merely suggest the scheme of decoration in abbreviated color,—and then have your stage carpenter build the necessary frames, which he can do very readily from your model. Then cover the frames with light-weight canvas. When ready, prime them, first at the back, and then at the front. This will prevent warping and it is well to state here that all framed pieces should be primed front and back at the same time.

Referring to the model, locate the position of all windows and doors and draw them in, particularly the frames of each. Strike a line for the wainscot and also a line for the cornice or cove at the ceiling line. Then strike the frieze line and lay out the panels in the dado, after which the whole setting is ready for your paperhanger, who will have no trouble hanging papers of your selection.

When the paperhanging is completed, proceed to lay in the door and window frames in color, and they should bear relation to the general scheme. Also bear in mind that the doors can be hung in imitation-wood papers and it will only necessitate ruling the panels on them in light and shade in color.

Never render even a simple chamber too plain; it is better to rather overdo the ornateness to avoid "flatness."

A palace interior will allow you to go the limit in point of design, color, and general effect. The design must be a "Period" design, and the purity of the style must be observed with great fidelity.

The period in vogue with most scenic artists is the style known as "Louis XV." It is chosen by reason of its extremely ornate character. However, any of the known period styles lend themselves admirably to scenic effects.

G. Broes VanDort can supply any of the following authentic period styles and in almost endless variety: Italian Renaissance, Louis XV, Louis XVI, Louis XIV, Art Nouveau, Empire, Greek, German Renaissance, Gothic, Romanesque, Roman Ionic, French Renaissance, Sullivanesque.

Selecting an adaptable "plate" from any of the periods, you will find the plate selected best suited for your back drop and you will have recourse to other plates in the same style for wings, borders, and side set pieces.

After selection, proceed to create a colored sketch of the entire "palace," drawn to half-inch scale, and then mount the back-drop stretch on the painting frame, and have your stage carpenter frame and profile your side sets. Prime the set pieces front and back when the stretch is primed. When dry enough to draw in, do so by the scale method. When the drawing is completed, "ink" the drawing in thin aniline color to make sure that it will strike through the lay-in.

Proceed to lay in, locating all of your big masses of tint and general color; using all of your laying-in color quite thin in consistency, practically cover all of the surface of the entire creation, being careful to follow gradations to a nicety if any occur (and they usually do), for the twofold purpose of relieving monotony and adding aerial perspective.

If the lay-in is cleverly rendered, it will leave but very little after painting, outside of the ornament, which can be handled comparatively easily. All ornament, gold molding, etc., can be embellished to the last degree of richness if the high lights are gilded in Dutch metal or aluminum leaf. If aluminum is used, it can be glazed with yellow lake to imitate gold.

Prepare size for gilding as follows: 6 parts heavy cabinet glue, 1 part glycerine, 1 part molasses. Apply to high lights with oxhair pencil; let it set for tack (which will be in a few minutes), and gild on the tack, applying the leaf directly out of the book. A little practice will enable you to get the right manipulation, and even if you waste considerable "leaf" in your first attempts, the metal is not expensive. This operation ought to complete your palace.

INTERIOR LIGHTS AND SHADOWS

As a rule interiors are illuminated from below, with the shadows striking upwards, assuming the source of light to be placed about five feet from the bottom of the scene and a considerable distance in front of it. (This source of light must be purely imaginary; you merely imagine it and control the light and shadow on your stretch accordingly.) All detail and modeling occurring below this imaginary source of light would, of course, be lighted from above.

For a dark, richly carved, oak interior, it is an excellent plan, after the scene has been carefully drawn in, to glaze it all over with Vandyke brown, adding here and there a little raw sienna and brown ochre. This glazing must be done as rapidly as possible, and with a good-sized brush.

To get rid of the smeary appearance the first glazing causes, successive glazings will be necessary; even then you must not expect it to look well. The solid color, lights and shadows, and the general delineation will force it into quality.

On this glazed ground some semi-opaque purple tints and pleasing grays will produce a good effect. The lights should be gray, and the shadows should carry some rich, warm, reflected lights. Rule and "cut up" with Vandyke brown and carnation lake, to which add a little Prussian blue to reduce the redness; and for the extreme darks use Vandyke and Prussian, mixed with half-and-half size.

To represent the oaken library, we can proceed in the same way, regarding the glazing, etc. The library shelves and books are rendered in the after painting. The glazing forms an excellent ground to work upon and gives a tone to the whole scene.

If a prison, hovel, vault, or ruined chamber has to be painted, lay in the scene all over with some half-dozen tints of various kinds, broken one into another, for which purpose use up the "slush" colors that are bound to accumulate in the studio; that is, the tints and colors that remain after a set of scenery is painted, or that have been mixed and rejected, the scrapings from the palettes, and any waste color that would otherwise be thrown away. It is surprising what admirable tints are thus accidentally produced. It also may be stated that whenever any pots have to be cleaned out, two or three of the purple tints might do fresh service by mixing or "boxing" them together, and so with any series of tints or colors closely related.

This laying in of the broken colors answers well for rocks and crags. In every instance, the laying-in must be executed before the drawing is commenced, some strong size having been added to all of the broken colors in order to obtain a good firm ground on which to draw and paint;—this ground so created being

retained over almost all of the scene, just as a discreet artist would do when he selects tinted paper for his crayon or water-color drawings.

XIII

DRAWING AND ARRANGEMENT OF SET SCENES

The important factor to consider in the creation of set pieces is that of separating composites from the back drop and bringing them forward to occupy positions dictated by the rules of perspective.

In the drawing here shown for an example of a set scene, it is hardly necessary to suggest that the line running nearly across the scene, just above the small bridge, would be the logical one to form the top or profile edge of the second "ground row," which will, when in position on the stage, act as a mask for a string of lights, placed as near the top edge as possible without being in sight.

The next "ground row" is for the purpose of masking another string of lights, which will light up the back drop; and the raking piece to the right, and in front, serves to break up the stage a little more, and to mask a raking platform for some of the characters to make their entrance upon, if required. Figure 51.

The two screens, one of foliage and one of architecture, serve the double purpose of adding materially to the picturesque arrangement of the scene, the distance being viewed between and partly through them, and forming masking pieces for an upright string of lights, from which a brilliant light can be thrown on the scene. One of the upright strings of light can be hung behind the double columns and another behind the single column, on the left-hand screen, and a third on the solid portion of the same. Two upright strings of light should be hung on the solid part of the right-hand screen, as near to the front edge as possible. To each of the wings there should also be hung upright lengths of lighting. All of these lights, with the aid of the border and foot lights, would light up the whole setting sufficiently well. Figures 52 and 53.

In arranging a set scene, always let those objects or parts which you desire to feature strongly, be in a set piece, as, in addition to the strength painting can impart to a scene, a strong light behind will immensely increase the force, and cause the view behind to recede still further back. Figures 54 and 55.

The number of set pieces in the drawing could be increased to any amount. Thus, the group of ruins and the tree in the middle distance, with the broken ground, etc., belonging to it, forming another line of composition running across the scene, would make

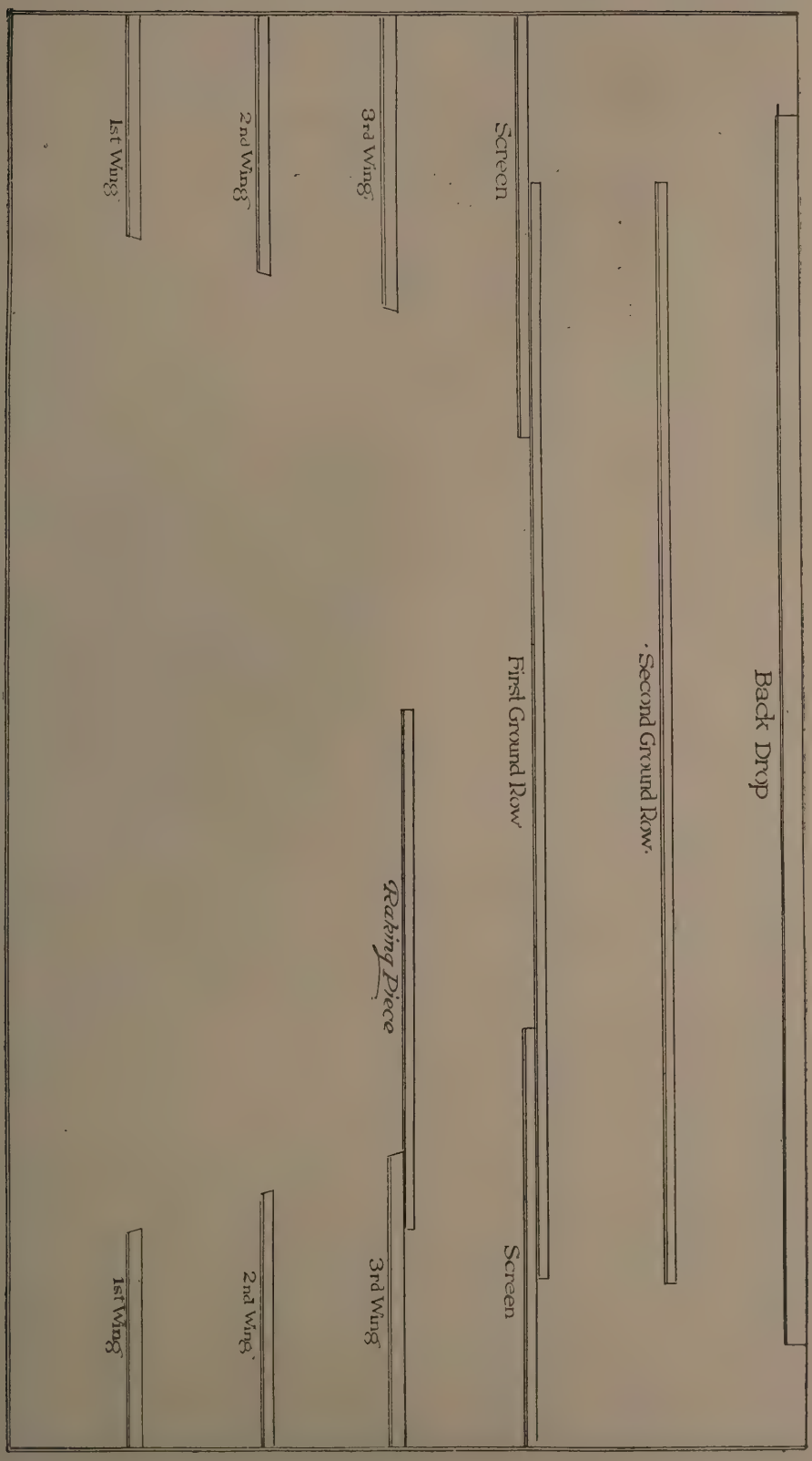


Figure 51.—Ground Plan of Set Scene.

Figure 52.—Complete Set Scene.

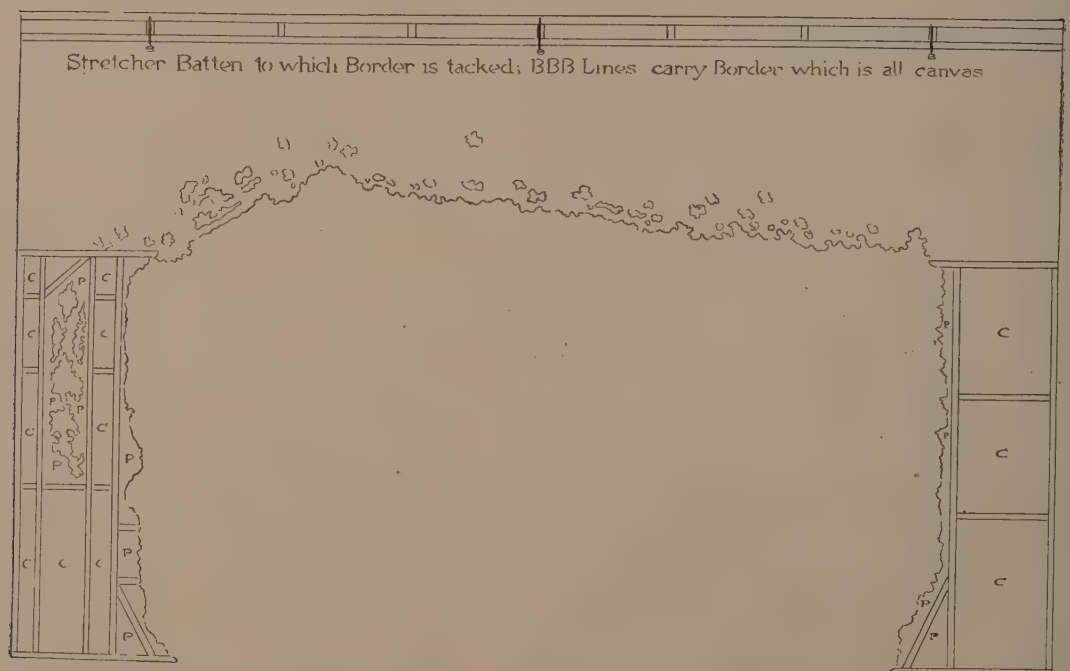


Figure 53.—Back of First Wings and Border. Straight Lines Indicate Light Wooden Stretchers and Where it is Marked "C" it is Fitted with Canvas and Where it is Marked "P" it is Fitted with Profile.

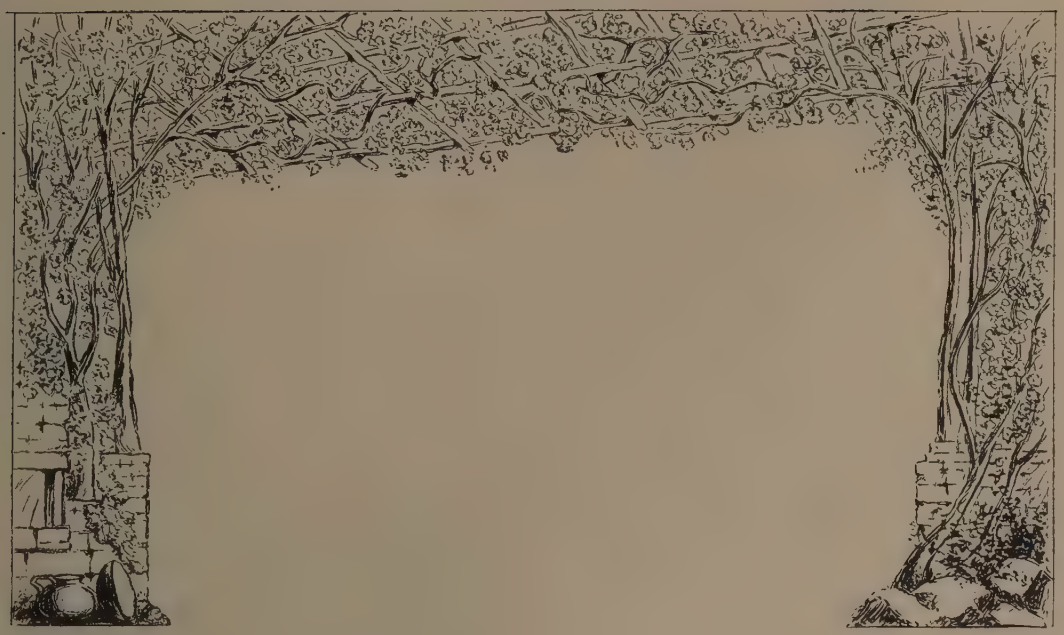


Figure 54.—No. 2 Border with Wings.

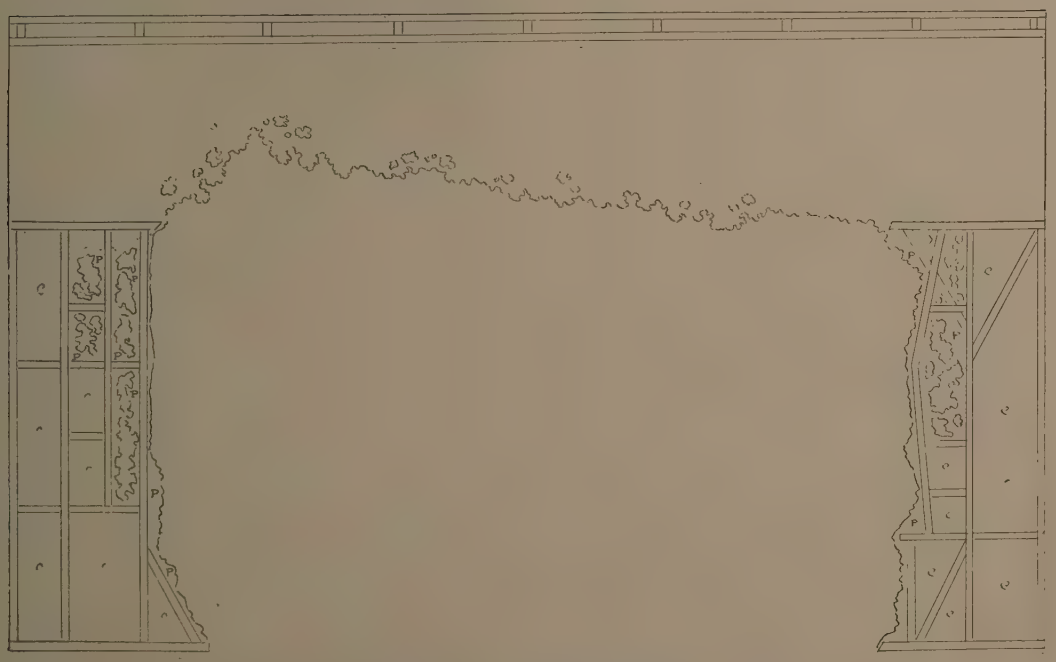


Figure 55.—Back of No. 2 Pair of Wings and Border.

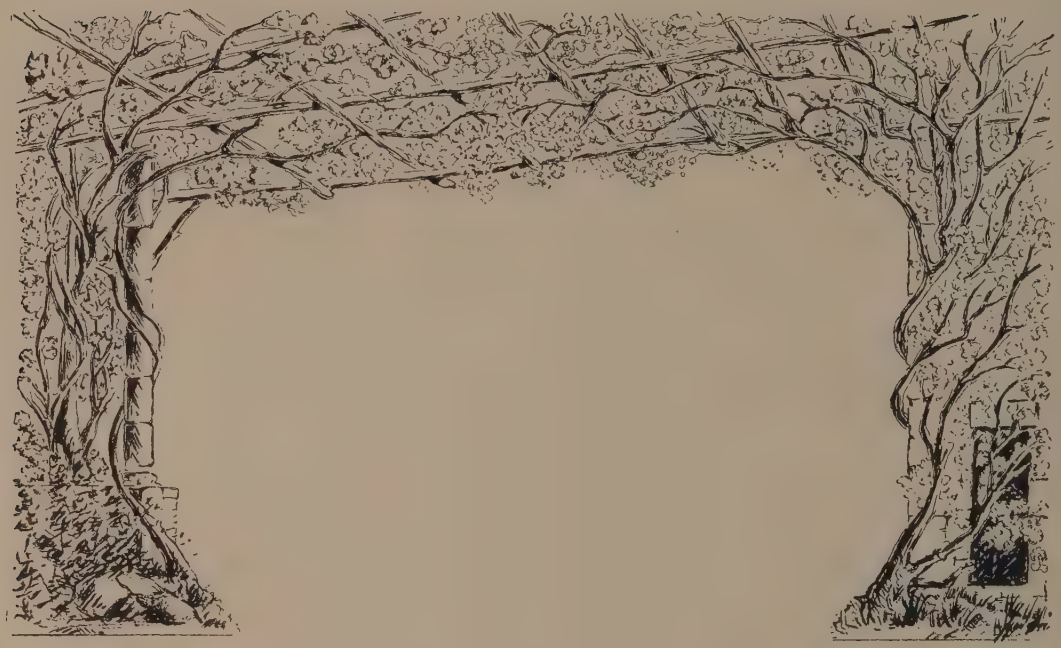


Figure 56.—No. 3 Pair of Wings and Border.

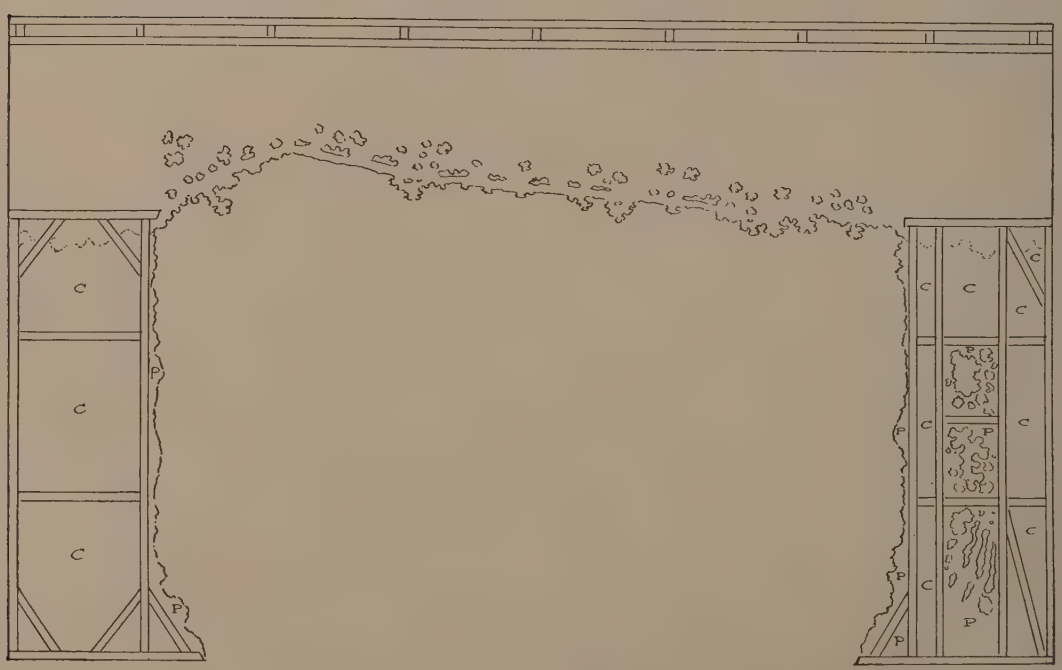


Figure 57.—No. 3 Pair of Wings and Border.

Figure 58.—No. 4 Pair of Screens.

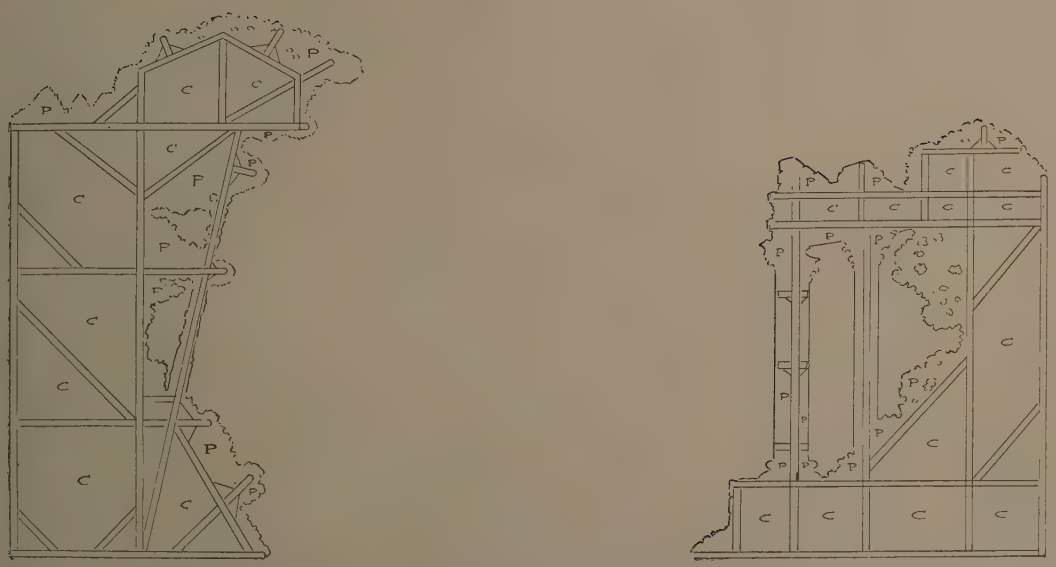


Figure 59.—Back of No. 4 Screens.

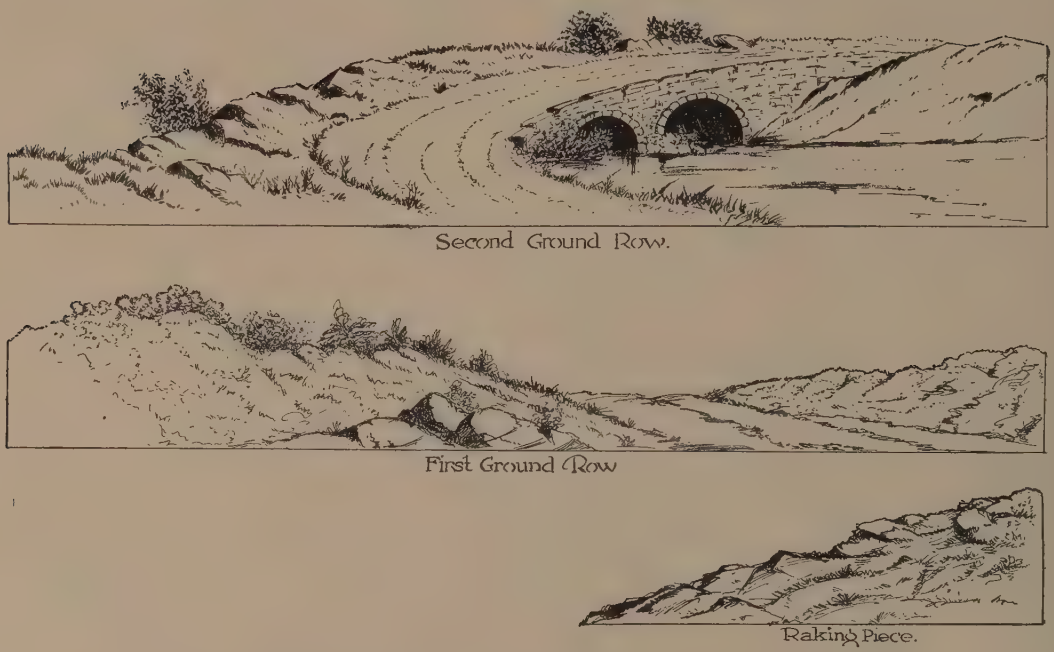


Figure 60.—Raking Piece, First Ground Row, and Second Ground Row.

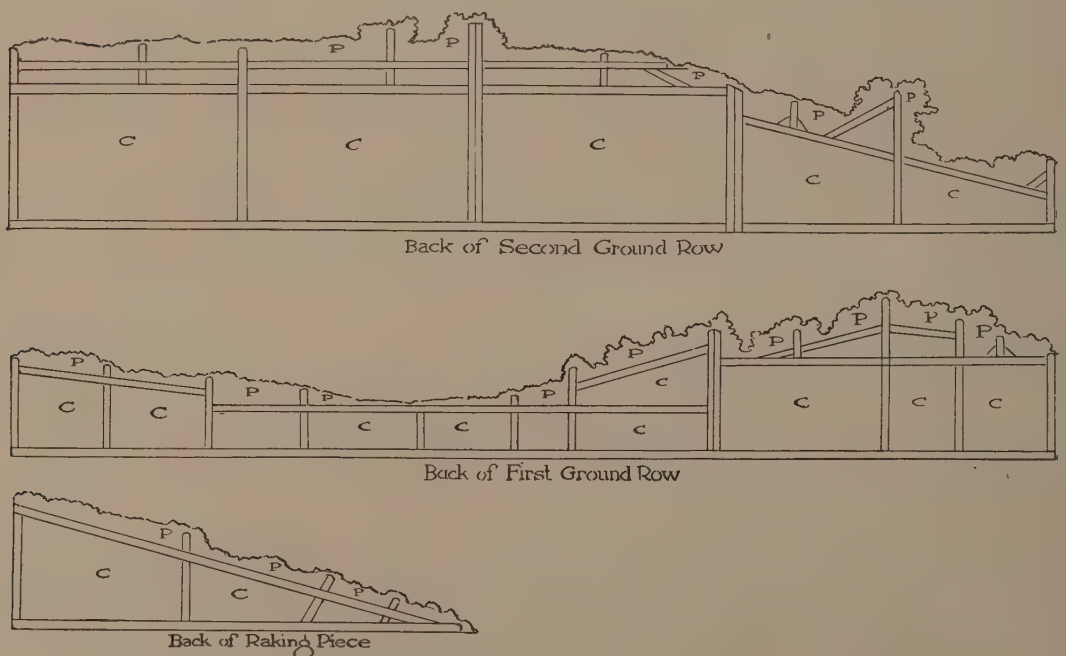


Figure 61.—Back of Raking Piece, and First and Second Ground Rows.

a very good set piece or row, if the stage is sufficiently deep to afford room for it.

In arranging set pieces, always see that they help the composition of the scene as a whole, and that the outlines of the pieces flow agreeably into one another, or else form bold contrasts. Figures 56 and 57.

The borders in a set scene generally present some difficulty. In the drawing, they have been made to represent overhanging vines, supported on a rude pergola effect. These form a pleasing frame to the view beyond, and are preferable to arch sky borders, which in the main could have no meaning and would be very difficult to manage in up-front position. Figures 58 and 59.

As borders cannot be dispensed with in scene painting, it is best to turn them to good account whenever possible. As a general rule sylvan borders are to be preferred to skies, unless the nature of the landscape renders their adoption impossible or unsuitable.

You will also note in the accompanying drawings, the appearance of the back of each wing and set piece when framed, and also where the canvas and profile should be. Figures 60 and 61.

MAKING PROFILE

For making profile, use clear white pine, free from knots, half an inch thick, 11 inches wide, and 12 feet long. Rough plane both sides and carefully plane the edges to be joined. Three of them should be laid flat on a bench, and the edges joined together with strong hot glue.

When dry, lay flat, apply a thin coat of hot glue, and cover with scrim canvas on both sides. Where the glue strikes through it can be sponged off with hot water. Place or hang the boards so that the air can get at both sides, and when dry, prime on both sides with stout priming.

For small work and edges of set pieces and wings, single width boards can be prepared in the same way.

XIV

TRANSFORMATION AND FAIRY SCENES

It is only necessary to say that transformation scenes are largely made up of a series of solid drops, net drops, and transparencies, with accompanying borders and wings; and that the designing and painting are not confined by any conventional procedure. You have full scope in the creation of scenery that must be highly spectacular, mystic, impressionistic, or elaborately fantastic, making use of elaborate formal gardens, crystal palaces,

crystal caves or grottos, and elaborate submarine settings, with practically no limit as to design and execution. Suggestions are freely given by the author of an extravaganza show, which allow you full scope to build up his idea. You are free to consult the chief stage electrician and the stage carpenter, whose assistance and co-operation will be very valuable to you in the creation of a transformation; in fact, their services cannot be ignored, as without their collaboration your design and its creation would die "the death of a rag doll."

Transformations should be rendered in bright high key, and a great deal of pale neutral gray should be used, which will enhance all color tints and color grays. The pale or high-keyed tints or values produce a fine background for the elaboration of the entire creation, in which Dutch metal, tin foils, and spangles are lavishly used.

Attach Dutch metal in the usual way. When attaching different colored foils, use glue and push little wads of cotton under each piece to project it a trifle, so that it will catch light. Handle strips of foil the same way, omitting the cotton; simply attach it in pleats.

Matted gold and silver may be used in large quantities without producing a garish effect.

Both silver and gold can be glazed effectively with oil colors in tubes, using lakes, blues and greens with quick-rubbing varnish cut with a trifle of turpentine, for mixing and thinning medium. With them it is possible to produce fine prismatic effects inside of shells, etc.

And, lastly, the success of a transformation scene is largely dependent on mechanical effects, which are contrived by the chief stage mechanician, who will be found ever ready to do his share towards making a transformation a full success.

Many of us can remember the beautiful and wonderful transformation scenes in the old Hanlon's "Fantasma" show, and those in the series of extravaganzas put on by David Henderson at the old Chicago Opera House in the early nineties, which were also wonderful examples of scenic art. These transformations were by Wm. Voegtin & Son, noted scenic artists of that time.

A fine fairy grotto can be produced with a back-drop showing full moonlight upon the surface of a lake. Cut a round hole in the stretch for the moon, and fill the opening with a piece of clear tracing-cloth mounted on the back with glue. By holding a flat smooth board against the front of the stretch at the opening, the tracing cloth can be mounted neat and smooth. If any glue escapes around the inner edges, wipe it clean with a dry rag; don't wet it or it will buckle badly; if you are careful, this cannot happen.

Render the whole stretch in a bright nocturnal key, and for the stars use spangles of various sizes, each one bent a trifle, the better to catch the light. Hang the stars in position by passing

short dark-blue line threads through a hole in the spangle; tie off, leaving about an inch and a half of loose ends; dip the loose ends in glue and hold to place with a little block of wood, allowing the spangle to hang loose so that it may twinkle.

The moon should be kept close to the horizon and its reflection shown on the ripples; with a sharp knife cut small irregular slits throughout the entire reflection, to within 16 or 18 inches of the bottom of the stretch; the largest slit to be not more than a quarter of an inch wide in the widest part, and not more than two and a quarter inches long; keep the slits irregular in size and follow the lights as represented in the painting.

In front of this back-drop hang a bunch of *tarlatan water strips* on a tautened wire, made fast to rigging at each end of the stage and tautened with a turnbuckle. Make the tarlatan strips as follows: Take Diamond dye and dye the tarlatan gauze in the deep local tone of the water in the back-drop; when dry, cut the back strip full width of the stage and 3 feet 6 inches deep; then take another piece 3 feet deep, same length, and tack it on the back strip with needle and thread, 6 inches below the top edge; next tack a third piece of tarlatan 2 feet 6 inches deep to the second, and 6 inches below the top edge of *it*, as before. To the bottom of all three pieces, whose edges will be even, sew a piece of triple-folded tarlatan or scrim, 1 foot 6 inches deep, so that the total depth of the water strip will be five feet or the depth of the horizon. If the horizon is higher than five feet, more strips can be added, allowing 3 inches difference in the depth of each; or, in other words, use enough strips in the water row to give a proper diminution or gradation to the limelight which will show through the slits in the back-drop. Also duplicate a few of the reflected spots of moonlight on the tarlatan strip.

To illuminate the scene, hang a stretch of white muslin three or four feet back of the back-drop, and large enough to cover the water area shown on the back drop; cover the little muslin stretch thickly with spangles. Near the base of the back-drop, close to the stage floor, arrange a row of lights which will fully illuminate the "spangle cloth." By shaking the spangle cloth gently, a pleasing realistic effect will be noted "out front." Sunrise and sunset can be produced with the same drop and water strips, by using red lights instead of amber as in the moonlight.

Forward of the back-drop a series of "profile cuts," mounted on blue-gray netting, are suspended from "fly" battens. The profiles would be elaborate composites representing grotto, ravine, or rocky glen, plentifully bespangled and gilded.

PROFILE CUTS ON NETTING

Wings with much profile are very expensive, and it is difficult to join them to the borders, since they must be painted separately; so, in place of them, we render wings and border complete

on a full-sized stretch, and when finished we take a sharp knife and cut out the entire creation and all of the openings found inside of the principal outline in a most elaborate manner. The center of the stretch is, of course, wasted, and can be used for covering small set pieces in other productions.

After cutting is completed, lay the painting face downward on the floor. Lay fine open-mesh netting over all, taking care to get an even spread (and only stretch enough to get into good square lines). Tack lightly around the edges to hold the netting in place, and proceed to attach the netting to the painting by cementing fast the mesh intersections, using a good stout glue prepared as follows:

Grain alcohol, 2 pints; sandarac, 2 ounces; mastic, 2 ounces; turpentine, 2 ounces. Dissolve the two resins—sandarac and mastic—in the alcohol, and then add the turpentine to the solution. Make up some very strong glue in the glue cauldron, about 2 pints, and add to it 4 ounces of isinglass. Place the alcohol solution in a hot water bath (cabinetmaker's glue pot will do) and heat it until it begins to boil; then very slowly stir in the warm glue. The amount of glue to be added is determined by noting the point at which, after thorough mixture, a thin paste is formed, capable of being strained through cloth. When required for use, the strained mixture is to be warmed and used like ordinary glue.

When cementing the netting, follow the outline of the profile and all of the openings, as well as the outer edges. When dry, it can be taken up and rolled as easily as a solid drop.

Netting can be had in all colors ready for use. Bluish-gray is the best to use, as it is almost invisible, even to the front rows in the parquet of the house.

To avoid seams in the center of the netting, provide a stretch of netting for the border and join side pieces of netting to carry the wings and have them reach the stage floor.

XV

TRANSPARENCIES

For your stretch use "Indian head" or Atlantic "A"—either of which is a fairly heavy unbleached cambric averaging about 2¾ yards to the pound; or cotton scrim can be used.

Mount the stretch upon the painting frame and give it a wash-down of clear water applied with a wide kalsomine brush. This will lay the nap of the cloth, and leaves the surface of the material in satisfactory condition for painting.

For the work use Diamond dyes for wool or silk, the follow-

ing colors being especially satisfactory for this purpose: light blue, green, dark green, yellow, orange, brown, seal brown, scarlet, and crimson. By using combinations of two or more of these colors practically any hue can be produced.

Make a weak solution of the dye, using hot water as a solvent. When it is cool the dye may be applied directly to the material, using the plain water solution or thickened a little with flaxseed paste. Many scenic artists, however, prefer the plain water solution, since it leaves the material in a more pliable condition.

The lighter color values should be applied first, gradually working up to the deeper values; this avoids a tendency toward the running of the darker values into the lighter ones, which would be noticeable were the dark values applied first. For the high lights leave the white cloth, just as would be done on a small water-color rendered in pure wash-drawing style.

This manner of handling will produce scenery that may be folded and packed in trunks without injury, and can be made to occupy a small space in packing. When soiled, they can be cleansed by immersing in gasoline; *never in water!*

"Dye drops" are much in favor with vaudeville artists who carry scenery for their act.

Your first few trials with dyes may discourage you, but if you will persevere and handle the stains just as you would in small water-color wash-drawing, by starting with weak washes and allowing them to dry, rendering subsequent washes in repetition until the desired depth is attained, your efforts will be crowned with eventual success.

On a "dye drop" moonlight, daybreak, sunrise, and bright daylight can be made to follow each other in succession by simply rendering a landscape in rather high key with just a suggestion of red glow in the sky. With low blue and green lights in front it will show a moonlight.

For sunrise, hang close to the back of the dye drop an opaque masking cloth (primed in the usual way); have it three-fourths the depth of the dye drop, and to the bottom of it sew a piece of crimson silk four or five feet deep; soften the edges with priming to break up the abruptness. To the bottom of the crimson silk strip sew a strip of yellow silk about four feet deep, and soften it by blending the crimson into the yellow, using Diamond Dye crimson. The silk must be quite transparent, so that the light will penetrate it agreeably.

When properly hung, a part of the crimson silk will appear above the horizon; for daybreak, show a dim light behind and increase its intensity as the masking-cloth is raised slowly, the lights in front being worked around from blue to red and then to yellow, in unison with the change at the back, with the green lights in the wings gradually turned down and the white lights turned up.

By reversing the movement, the same painting and arrange-

ment will serve to represent the change from sunset to moonlight.

For a stormy sky a transparency produces a fine scenic effect, when well managed. Huge dark masses of clouds can be painted in, and as these are in reality lighted up from the back, lighting can be made to flash from behind them very cleverly with proper stage lighting effects.

Fire scenes also call for a transparency; on the face of the stretch render the building or buildings complete and intact. When dry, turn the stretch and render the buildings ablaze with leaping flames; silhouette the ruins and fallen walls in opaque color. To work the scene, hang three opaque masking-cloths close to back of the scene on separate battens; they should be equal in size and should cover the scene completely, with roughly cut edges on the laps; the laps must also be deep enough to exclude all light from the rear when cloths are down. When the fire is supposed to break out, raise the middle mask; the back lights will then cause the painted flames to appear. Assist by burning small quantities of "red fire" while raising the other masks, keeping the red fire flashing until the end of the scene.

XVI

POUNCES, STENCILS, ETC.

For repeated ornament, conventional or otherwise, always prepare pounce patterns. Use fairly heavy manila paper or heavy detail drawing paper.

For corner ornament, provide a piece of paper much larger than the size of ornament to be drawn, in order to have plenty of margin. Strike a full square at the edges of the paper and then strike a diagonal line from corner to corner. Fold the paper on this line and proceed to draw in full half of the ornament. Then lay the folded paper down on two or three thicknesses of muslin, and perforate the drawing with an ordinary perforating wheel if the drawing is large; and if the drawing is small, perforate with the small swivel perforating wheel. By keeping the paper folded, you perforate both sides of the pounce at one operation, as well as produce an exact replica. Unfold and lightly sandpaper the perforations on the reverse in order to free them of the pulp.

For center ornament fold at the center of the paper on a perpendicular line, drawing half of the ornament as in the foregoing, and proceed as before.

For full ornamental panel, either oblong or square, simply fold the paper twice on horizontal and perpendicular lines passing through the center, which will leave one-fourth of the paper

exposed. Proceed to draw in one-fourth of the ornamental design and perforate the four plies of paper, which will result in the complete ornament when unfolded.

When drawing conventionally in the sketch room, the same plan is followed on models, except that carbon paper is placed between the folded paper, carbon side up. The completed ornament is obtained by tracing the half or quarter, as the case may be, with an 8H drawing pencil. When completed, the back of the paper will show the full ornament in carbon. Then the pattern so obtained can be traced on to water-color board by rubbing the back with charcoal crayon, and if a more permanent tracing is desired, rub the back with dry English vermilion. Lightly dust it off to rid it of surplus pigment.

STENCILS

Stencil ornament should enter largely into elaborate "palaces" and interiors, and also on "grand drops" and borders. Advertising drops also, if ornate, can be nicely handled with stencil ornament.

Pounces answer for small masses of ornament, but where you have much ornament to execute it is best to lay it in with stencil pattern.

STENCIL PATTERNS

Take a piece of manila stencil paper the size wanted and oil it with linseed oil 3 parts and kerosene 1 part. Take an impression from your pounce and with a regular stencil knife proceed to cut the openings, leaving small "ties" at weak spots. Do the cutting upon glass or smooth pine board free from knots.

A single, or what is known as a "male pattern," will do for simple ornament. When more intricate or complicated, a "male and female" must be cut as follows:

Take two pieces of oiled stencil paper the size desired, and lay the pounce on top of them. Thumb tack them to drawing-board and then cut register marks in opposite corners; cut them small and in form of a square, triangle, or cross. Then take an impression of the pounce on the first or male pattern. Separate the patterns and cut openings in about one-half of the male pattern; then lay it on the second or female pattern, taking great care to match up or register with the register marks in the corners. Pounce the openings with your pounce bag, which will give a "male impression" on the female pattern. Remove, and place the original pounce pattern in register on the "female." Take impression, remove, and finish cutting the uncut portion of the ornament, which is then clearly shown. Additional patterns may be cut if the same plan is adhered to, forcing each subsequent pattern to register with the preceding one.

STENCILING

When ready for the work, mount the stencil pattern upon a light pine frame; the frame to be on the front or face of the pattern, so as not to interfere with the contact side of the pattern. Nail a little strip across the frame for a handle and it is ready for business.

Mix the desired lay-in color quite heavy, and charge the stencil brush by stamping it in the color. A good plan to keep from overloading the brush (which would be disastrous) is to have a little pine stick in the color with a little pie-tin close by; drop the color that adheres to the stick on the tin plate, amounting to a few drops; stamp it into the brush, and repeat about twice on an average, and you will not be troubled with an overdose of color on a stencil pattern.

The ornamental area being determined, snap some lines as guides for the stencil pattern. Hold pattern in position at the starting point; with the charged brush drive the color through the openings by holding the brush firmly against the pattern. Start the brush in a circular motion, forging ahead as openings are filled, maintaining the motion and pressure simultaneously. Under no circumstance attempt driving stencil color by stamping; it is highly impractical, and to be avoided on any kind of surface, —much less a scenic stretch, where the action of stamping will positively break the glue in the underlying color. This is the principal reason why we have the pattern on a light frame, as the frame keeps direct hand and finger pressure away from the stretch. Another reason for the framed pattern is that it is more easily handled and wears longer.

Note.—Before using the stencil patterns, they should receive several coats of grain alcohol shellac to prevent water saturation.

After the ornament is all laid-in by the stencil route, a single-stroke shadow and single-stroke high light will bring the ornament into relief. Finish by giving the entire ornament a cast shadow, monotone to the ground it rests upon.

PRELIMINARY DRAPERY STUDY

There is nothing that equals actual drapery to study and sketch from in a preliminary way. Six or seven yards of white satin, with cords and tassels for "still-life model," will equip you.

Pose the drapery over a chair or broom handle. Arrange the pose with a blunt pointed stick, rather than with the fingers, which will result in folds having better "action" and more crisp in "feeling." Never release a drapery pose until you have at least one serious sketch of it, in either charcoal or full color. In this way you will eventually have a portfolio of serious drapery that will become valuable in the creation of actual model or sketch, and upon the stretch.

TAPESTRY

You will frequently encounter tapestry panels on the walls of palaces, and otherwise. They can be imitated very agreeably by rendering in subdued tone, and when fully rendered, proceed to "cut up" with horizontal fine lines, covering the entire panel. The lines will "break" the panel and give a feeling of tapestry when viewed at a short distance, or from the body of the "house."

For tapestry lining color, use carmine lake with a touch of Vandyke brown in it. Rule the lines against a straight-edge with a brush made as follows: Take a smooth little block of pine 3½ by 2½ by ½ inches; bore seven ¼-inch holes in the butt end of it; fill the holes with seven No. 2 bristle "liners;" cut off the brush handles enough to allow the brushes to extend 1¾ inches from the end of block; bore the holes a half inch apart, which will leave one-fourth inch between each brush.

SECTIONAL SET PIECES

Your carpenter should construct set pieces in sections, with hinges in the middle of each section. They can then be folded, face in, for shipment. Pull the pins from the hinges and use nails instead, so that sections can be separated quickly and set up quickly.

NIGHT SCENES

A street scene at night can be made very effective if the windows in the building are illuminated. Produce the effect by cutting out the windows after the scene is painted; fill openings with sized pieces of linen glued to the openings from the back.

The linen will be all right for windows in the distance, but for those close up use clear tracing cloth.

When cutting out the windows pay no attention to the sash, as the sash can be ruled in after the transparency is in place. The street lights can be handled in the same way, which will add to the effect. The scene must be an opaque in order to get the maximum result; that is, it must be rendered upon "sized-in" Pequot 8/4, or decorators' cloth, and in the usual manner.

STAINED GLASS WINDOWS

Reproduce a stained-glass window design in a cathedral drop, cut out the openings for the "glass," and fill the openings with clear celluloid, gluing at the back as in the street scene. The panes of celluloid can then be stained by stippling them in any stain dictated by the model. Use tube colors in oil, thinned with boiled linseed oil to which is added a trifle of Japan gold size to insure drying. Applying with a flat camel's-hair brush, and stipple with a small cotton bat inclosed in a piece of cheesecloth. The stippling should be applied to the back of the celluloid, which will facilitate the operation. As in small windows, the leaded deline-

ation of the design can be introduced upon the celluloid "face" in opaque color.

GROMMETS

Net drops and dye drops should be bound along the top edge with a narrow strip of six- or eight-ounce duck, and the strip set with brass grommets five or six inches apart. They can then be quickly lashed to the battens when they go into commission.

FIREPROOFING

In all standard theaters of today it will be found necessary to impregnate any scenery you may do for them with a fireproof solution made as follows:

Use water glass (silicate of soda); thin it a trifle with water, and add enough working glue size to bind it; then break up enough whiting in it to render it quite opaque and use it the same as ordinary priming. Set pieces should be coated on both sides, including the frames.

Water glass can be obtained at almost any drug store, and needs only to be thinned with boiling water or heated in the glue caldron and *then* thinned. If you cannot obtain water glass at your druggist's, it can be made up with very little trouble as follows:

Four parts borax, four parts potash, to 100 parts boiling water; stir in 100 parts silicate of soda; keep hot until all is nicely dissolved, when it will be ready for use. It can be kept in stock and heated the same as ordinary size when wanted for use.

XVII

POSSIBILITIES OF SCENE PAINTING

The large metropolitan theaters are naturally supplied by the large scenic studios to be found in all large cities, and quite naturally the smaller studio cannot expect to get any of their business. All big productions are, with few exceptions, executed in either the Lelash Studios, New York, or the Sosman & Landis Studios, Chicago.

The smaller studios devote most of their efforts to special small sets of scenery, which comprise vaudeville specials, complete stage settings for small theaters, music halls, lodge halls, casinos, and cabarets; complete sets for small stages in schools and colleges, mural painting in distemper and oil for the decoration of public buildings, private residences, etc., and, lastly, scenic window backgrounds for retail merchants and department stores; spectacular scenic effects for amusement parks, or rather the conces-

sions in amusement parks, which comprise shows of various kinds, all or most of which use a scenic effect of some kind. Spectacular floats in street pageants also call for the liberal use of allegorical creations and scenic effects.

From the above list it can be easily deduced that the small studio's activity is only limited in proportion to the effort put forth to get its share of the business in a field rich in possibilities. Large private enterprises have patronized the scenic artist quite liberally in the creation of special exhibits at expositions, state fairs, etc.

Apropos of the foregoing, it is a widely known fact that few cities of 100,000 population can boast of a regular scenic studio, to say nothing of much smaller cities; and while it is true that a real scenic artist can oftentimes be found in the smaller cities, he is usually hidden away in the employ of the leading decorator of the city, and for various reasons does not see his way clear to the point of building or equipping a real scenic studio in so small a city.

Civic pride will prompt local promoters of any special event, such as carnivals, pageants, street fairs, and expositions, to patronize local talent in any form which will keep the appropriation expended at home to be again circulated locally. If the promoters are compelled to buy scenic or other productions in a large city, it takes just that much of the appropriation away from local circles. Almost the only question arising is that of quality, which, of course, rests with the individual. It is up to the local artist, therefore, to deliver the same quality and service that are offered by the big-city competitor. Doing this, and doing it enthusiastically and well, will result in establishing your studio on a sound footing; and when the reputation of your studio spreads to nearby cities and towns, your condition will be an enviable one.

Finally, it must be borne in mind that scene painting is hard work, both physically and mentally, and when indulged in every day will yield all of the physical culture necessary to the promotion of good appetite and sound sleep. The work is fascinating and full of interest to those filled at all times with enthusiasm and the desire to excel; if you are not so constituted, it would be better not to make the effort. Scene painting will promote all of the latent talent you possess and reward you in exact proportion to the ability and talent developed.

A visit to your local theater will repay you in the intimate knowledge that can be gained by going behind the scenes and taking close note of drops, rigging, and general stage setting. If there is no standard house in your city, make it a point to go behind the scenes the next time you visit the big city near your home town.

The student who aspires to the mastery of scene painting will find much in the educational division of this work that will

greatly assist him, notably the glossary of terms, the section devoted to drawing, and the sections devoted to linear and aerial perspective. Thoroughness in drawing cannot be too strongly advocated; through drawing and that alone will you be able to distinguish yourself. Painting, however cleverly rendered, can never hide poor draftsmanship and redeem it from just criticism.

DROP CURTAINS

A great variety of style can be indulged in drop curtains, and there is practically no limit; it can only be circumscribed by individual talent and versatility. However, it is customary to make use of a piece of grand drapery at the top, and a centrally located scenic panel, in which is displayed an interesting landscape or a piece of allegory, the panel being surrounded with a highly ornamental border or frame, and the remaining ground treated agreeably in low-keyed silk effect or tapestry, finished at the bottom with heavy ornament and fringe resting on a marble pavement.

Another popular drop can be produced by showing the entire stretch in elaborate landscape, omitting all ornamental detail,—which is more practical since the universal adoption of asbestos.

Asbestos or iron drops must be installed in compliance with city ordinances governing fire protection in first-class houses in most principal cities. The iron presents no problem, but asbestos is very disagreeable to handle on account of its heavy weave and spongy surface, although some wonderful scenic effects can be produced upon it.

ADVERTISING DROPS

These should be very ornamental in character and can be designed to meet the approval of the "house" if along "de luxe" lines.

An interesting pictorial in the center of the drop will kill the monotony of the advertising "cards." This pictorial can be surrounded with card divisions in rococo style and it is well to have the pictorial space lunette-shaped; that is, straight line on the bottom and arched with a shallow segment of a circle. A piece of drapery at top will not be amiss and the bottom can be finished in ball fringe resting on a piece of pavement. If the pictorial panel is dropped below the center a trifle, it will afford additional space in the background for individual lettering panels in ornate shapes and rococo in style. The color of the cards can be alternate tints, quite pale in value; all ornament in old gold with a touch of high light and shadow. Letter in "single-stroke" styles in black and deep, strong colors.

For lettering, use both flat and round oxhair brushes in sizes suitable to the size of the letter stroke, keeping in mind that advertising drops must be lettered speedily; therefore the many styles adapted to one-stroke execution are recommended.

OLIO DROPS

For an "Olio," quaint street scenes or wide terraces are recommended.

In the early days of the "movies," many of them installed small advertising drops which were easily filled with community ads. At the present time they have almost disappeared, supplanted by slide advertising, which is to be regretted in a way by the scenic artist. However, the moving-picture house, if more or less pretentious, can usually be induced to consider a few murals as a part of the decorative scheme of the interior of the house and in the foyer.

Now, in conclusion, if this book in its entirety, or either division of it, coupled with your individual efforts, assists you to a place higher up, with incidental increase in your earnings, you will confer a favor upon the publishers and the author by writing the publishers a brief letter, advising them of your success and to what extent the book helped you to gain success.

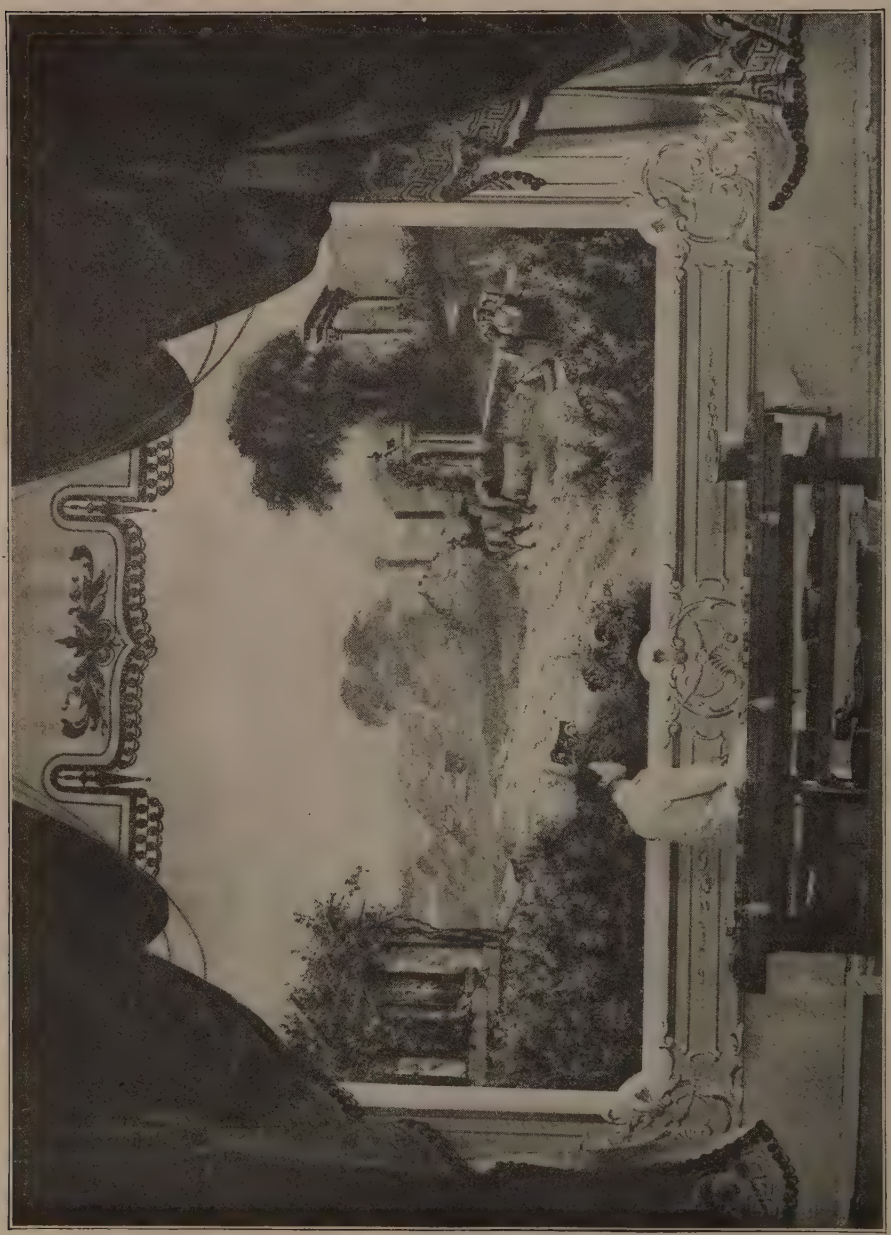


Figure 62.—Grand Drop, by Victor Higgins, Sosman and Landis Studios, Chicago.

PART III

BULLETIN ART

PART III

BULLETIN ART

I

OUTDOOR PAINTED DISPLAY ADVERTISING

A LITTLE BRIEF HISTORY

The development of the present high standard noticeable on almost every important outdoor painted display plant throughout the country, in all of the principal cities, has been largely from within; that is to say, by the artists themselves. Very little, if any, credit can be given the "office end," aside from keeping pace with the upward trend of the ambitious men furnishing the product known as outdoor advertising and capitalizing the output, which has manifested itself in a phenomenal growth of individual plants here and there over the country, notably in the large cities.

Lithography and posters formerly held priority in the outdoor field, and it was only natural that the pictorial feature of the outdoor painted display should be influenced by the precedents established in the poster medium. This led up to a quickening demand on the part of painted display plants for pictorial painters who could "deliver the goods."

There never has been a shortage of excellent lettering talent in outdoor painted display advertising, broadly speaking. Even back in the late eighties, we find the ranks being recruited from the commercial sign-painting field, which rapidly increased the quality and appearance of the painted display. Then, in turn, the letterers began to develop pictorial talent, on account of the demand for illustrations to accompany the text of the display.

In this way the letterers were literally forced to take up pictorial work. The client demanded it, and being "on the job," it quite naturally followed that the letterer would have the first chance; and thus we began to develop pictorial talent in the transitory stages of the painted display.

The business quickly grouped itself into three classes or divisions, away back there in the eighties, and an outdoor campaign embraced the three classifications—wall, bulletin, and fence displays. As the business and service increased, the fence receded to second place, and at the present time is almost an unknown factor.

Then in a comparatively short space of time, in 1889 and 1890, the interest of sign and pictorial talent became centered on the World's Fair, and Chicago became the Mecca, with the R. J. Gunning Co. (later The Gunning System) enjoying its first period of expansion and enlisting the services of all available good talent. Almost at once "Bob" Gunning had a galaxy of "stars," who in turn exerted a permanent influence upon those fired with the one great ambition; and these in turn supplemented their daily experience and contact with current demands, with nightly academic training in life classes, the most notable one at the time being "Smith's."

J. Francis Smith, but recently returned from the Julian School, in the Latin Quarter, Paris, established a nude life class at 46 Jackson Boulevard, which at once became very popular with the "semi-pros." Many of the Gunning staff enrolled and with them many from other lines of commercial art, notably from engraving houses and lithograph shops, with a resulting improvement throughout down to the present time, the bulletin artist taking his place among the ranks of the academically trained. The same condition was manifesting itself east and west.

INFLUENCE OF LITHOGRAPHY

Almost simultaneously, lithography advanced by leaps and bounds, and has right down to date influenced the outdoor artist and the designer of the painted display, who with few exceptions came from the ranks. Posters of all kinds, large and small, must be given credit for commercial art as we see and appreciate it today. Literally speaking, the painted display is simply a replica of the poster, rendered more permanent in paint and designed for a longer period of service. The poster holds priority in the field of outdoor publicity and precedents established by famous poster designers have had an agreeable influence upon paint designers, while it is a matter of history that the text or copy—literally, the lettering—on the poster of today has been influenced by the composition and styles shown on the "paint plants," developed by clever letterers. This has led to an apparent alliance of the two mediums in a relative way, and quite logically we now have many plants supplying both paint and posting service.

At the present time we have a few calamity-howlers, who are attempting to predict the passing of painted display and its importance as an advertising medium being completely supplanted by the poster. It is no doubt true that a few small local plants have suffered to some extent by the encroachment of the "stock poster," which quite a number of manufacturers have been persuaded to buy in large quantities. This, in a way, should not be very disconcerting if the plant is a combination paint and poster plant, as it gets the posting appropriation in any event.

SIZE AN IMPORTANT FACTOR

Size is and always will be the big argumentative factor in painted display advertising. The poster medium stops beyond a 24-sheet stand, whereas the painted display is only limited or circumscribed by the space available. The public at large has become accustomed to seeing mammoth wall spaces covered with artistic painted display advertising, without taking into serious account the human skill, experience, and daring necessary to place it there. Size, therefore, becomes the element most to be considered by client, salesman, and the man detailed to execute the display, namely, the artist.

To illustrate this point, one instance among many will be cited, to give emphasis to this all-important matter of *size:*

The "Bull Durham" advertising manager commissioned the Cusack Company to reproduce their popular litho, depicting a Mexican bull fight. The litho was high grade, in good drawing and beautiful tone and color. The space chosen was one of the Cusack Company's choice central or downtown Chicago locations, facing south on Wabash Avenue and Hubbard Court. It contained upwards of 5,000 square feet, and it fell to Louis Hanks of the Cusack staff, recognized for his long experience and great ability, to reproduce the "Bull Fight" upon the space chosen. This he accomplished in his usual manner and the result was worthy of a Corot or Murillo. It was an example of good art upon an immense scale, which elicited the sincere praise and appreciation of contemporary talent.

The ability to perform this feat—yes, *feat*—embodied superior draftsmanship, color interpretation, skillful handling, necessary to produce a broad technique; confidence, and lastly the nerve required to make "high swings."

The nerve is an acquired nerve, which develops as one gets used to the swing stage. All high walls, however, are hazardous and accompanied with great risk. But listen,—one of the first things acquired in display painting is safe rigging. The first thing shown a green helper is the safe and proper way to make a wall-stretch safe. He is taught how to "tie back" from the wall-hooks, and how to rig a double guy-line down the stretch.

"Safety first" is the display painter's slogan, and when we consider that millions of feet of wall displays have been painted in the last thirty or thirty-five years, with a small army engaged in the work, with comparatively few accidents and casualties, it certainly indicates a high degree of practical caution on the part of the average wall crew.

Everything in display advertising leads to the serious consideration of size. The contracts are big, the wall spaces are big, the bulletins are big, the pictorials are big, the lettering is big.

CONNECTIVE ADVERTISING

Connective advertising is the aim of all advertising men who give serious thought to the launching and promotion of a big advertising campaign, which embraces every medium of publicity. The fashion plate (by one of the Leyendeckers, Penfield, or Fisher, who, by the way, are among the highest-paid commercial artists) that greets you in the morning's mail as a feature of a leading manufacturer's style book, will in all probability greet you about town, showing upon attractive *de luxe* bulletins and prominent wall spaces, mammoth in size, a truthful reproduction as to color, drawing, and technique. The large all-over-town displays are the last link in a huge chain of publicity which embraces booklets, hangers, calendars, small and large posters, and lastly the painted displays; the entire campaign being positively connective, the illustration and distinctive or trademark lettering prevailing throughout the several mediums used.

II

DESIGNING

With few exceptions the designers of painted display advertising have been promoted from the ranks because of the intimate and practical knowledge necessary to interpret and analyze a display proposition and create designing that will be within the code.

The code dictates that a design for a wall campaign must be one that will transpose and adapt itself to any size or shape of wall without entirely losing its identity. And a bulletin design, in many cases, must be prepared with a view to transposition from 12 by 25 feet to 12 by 50 feet without loss of identity.

These considerations, together with working limitations and restrictions, must be observed at all times when designing painted displays. For example, a fashion plate bearing a dozen figures would not be prohibitive as a poster, whereas the number of figures would have to be reduced to two or three on a painted display, owing to the cost. While there are exceptions to this general rule, and we sometimes make use of five or six figures, we usually adhere pretty strongly to the rule.

Sign painting and the average, versatile, clever sign painters have never been properly credited with the important part they have taken in the promotion and perfection of "lettercraft" as we find it today. Too little attention has been paid to the influence

wrought by many of the expert individual letterers of this and former times; this influence has manifested itself throughout printing and lithography.

The influx of several expert sign painters into the realm of litho lettering and design, promptly marked the passing of the all-too-common letterpress poster, and ushered in the present style of poster, clever in design and letter composition, with an agreeable balance of masses and striking in color. This period dates from Matt Morgan's time.

Matt Morgan, in his day, won the distinction of being America's greatest poster artist; he was formerly a sign painter. Then, as now, the tendency of the big litho houses was the exploitation of clever lettercraft. There is now also a marked inclination to produce poster designs similar to painted display designs, which is an important concession and admission of the superiority of lettercraft exemplified upon the painted display plants.

SUBJECTS AND COMPOSITION

As an outdoor artist, you will be called upon to depict almost any article or object known to commerce. One day you will be painting a fashion figure, garbed in the latest mode; the next day may find you painting a distinctive type of automobile. The next few days you may be engaged showing a pretty maid serving a mammoth piece of pie, and so on. However and whatever it may be, you are, with few exceptions, supplied with a good miniature model or sketch, usually in full color, or if not in full color, partly colored.

If precedent "copy" exists in the form of a fine lithograph, it will naturally enter into and be featured upon the painted display, its position and manner of handling being determined by the display designer of the painted plant. What has been performed successfully in the past and credited as "big hits," supplies us with a good general basis upon which to calculate future operations.

The lettering fraternity (embracing printers, lithographers, engravers, sign painters, and display advertisers) concur very generally and almost unanimously in the present style and composition of lettering.

It is true, however, that we occasionally encounter specimens of the "stone age era" which flourished and had its being prior to the nineties, conspicuously bad in composition, with the text or inscription scattered over the entire space, with too much space between letters, and too much space between the lines of lettering, resulting in an entire absence of marginal or agreeable surrounding space. This, with a poorly executed style, exposing but a meager knowledge of lettering in either standard or modified form, constitutes what we are pleased to term a "stone age stunt."

TYRO VERSUS ARTIST

We find these specimens, as a rule, displayed upon smaller plants in the smaller cities, where the standard has not reached that maintained in the larger cities. The individual responsible for the "stone age stunt" is usually an artist but recently graduated from the house-painting ranks, known among his former shopmates as an "all-around man" and from their viewpoint a wonder,—which partly accounts for his indifference to the acquirement of professional knowledge, even when the opportunity presents itself, as it usually does in the person of a real display painter or designer "imported" from a real display plant in a big city.

The home-guard tyro proceeds to preserve a phlegmatic indifference to the efforts of the new man, who promptly tries to bring order out of chaos and elevate the standard of the plant by introducing professional methods and procedure. This quite naturally is resented by the tyro, and instead of assimilating the suggestions and profiting by the actual demonstrations, he promptly joins the "anvil chorus" and takes refuge behind the more than weak statement, often reiterated, that *he* "did the designing (get that), painted the pictures, bossed the men, kept books," and so forth.

Admitting the truth of the statement, it must be borne in mind that the activities enumerated can be easily identified with the early or infant stage of the plant's career. The new man quickly analyzes the situation and gives himself over to digressions and indifference. The "tank-town tyro" has surrounded himself with an array of talent inferior to himself in order to preserve his position; the new man's efforts under the conditions become futile, and he returns to the place whence he came, or joins the staff of an advanced plant where the atmosphere is more to his liking.

Self-preservation is the first law of nature and is primordial, and the tyro cannot be blamed for the close adherence to this great principle. He can and should be censured, however, for his apathy. Many of the foremost artists in display advertising and other lines of artistic effort, have given freely of their time and knowledge to ambitious students fortunate in the enjoyment of personal contact with them. Further, there are many seriously good textbooks, which have been written and compiled by notable authorities of the present time, and sufficiently advertised to be pretty generally known; and a comparatively small sum of money will place these books in the hands of the ambitious and eager student as well as the apathetic and indifferent tyro.

Granting the part professional jealousy has played in withholding trade secrets and methods from fellow craftsmen in former years, there is to be noted a strong indication of widespread

co-operation on the part of men conspicuous in the field of commercial art, with a firm and earnest desire to raise the standard and incidentally increase the knowledge, skill, and versatility of the individual craftsman, or artist if you please. Therefore the man who finds himself handicapped by nature, environment, or lack of proper training, if he but opens his eyes, will veritably find education knocking at his very door.

I have felt it necessary to refer to the "tyro" in order to forcibly bring out this voluntary tendency on the part of those who take a broad view of the situation and have no hesitancy in passing their knowledge along to the younger element or ones less fortunate, and the reference to the apathetic might keep you out of that class.

COMPOSITION IN LETTERING

Composition in lettering is almost too intangible to define by any rule. All suggestions that may be given are of necessity laid out on merely mathematical formulas, and as such are incapable of equaling the result that may be obtained by spacing and producing the effect solely from artistic experience and intuition. The final result should always be judged by its effect upon the eye, which must be trained until it is susceptible to the slightest deviation from the perfect whole.

It is more difficult to define good composition in lettering than in painting or any other of the more generally accepted arts, and it resolves itself back to the same problem. The eye must be trained by constant study of good and pleasing forms and proportions, until it appreciates instinctively almost intangible mistakes in spacing and arrangement.

This point of *composition* is so important that an inscription of most beautiful individual letter forms, badly placed, will not produce as pleasing an effect as an arrangement of more awkward letters when their composition is good. This quality has been so much disregarded in the consideration of lettering, that it is important the student's attention should be directed to it with additional force, in order that he may begin with a proper feeling for his work.

The accompanying bulletin designs at the end of this division will supply the student with a fund of reference sufficiently diversified to enable him to study the subject of composition seriously. The designs shown have been selected at random from the contemporaneous field and each design eloquently bespeaks the present high standard of bulletin art. A serious study of these designs ought to influence you to a very large degree.

When you essay original composition, bear in mind the all-important factor of space. Leave plenty of marginal background, and if possible, space your lettering close; that is, stand your letters intimately close together. This applies to practically every

lettering problem, regardless of size or kind, and on any surface, with the possible exception of wagon lettering, electric signs, and large lettering intended to carry and be legible at a long distance.

In wagon lettering, roomy spacing is a rule and a shade or thickness is added, which produces coherence.

Electrically illuminated letters are spaced roomily and light-faced to overcome the spread of the illumination, which apparently increases the letter face and lessens the space between letters, producing the effect of coherence.

On long-distance lettering, on factories, steamer docks, cliffs, etc., it is customary to allow the width of the letter stroke for the approximate space between letters.

STYLES IN LETTERING

Now I am about to say something about *styles,* which I trust will not be said in vain. Develop and become familiar with all of the conservative or standard alphabets. Study them and learn all of their characteristics and distinctions; and acquire equal facility in executing any particular alphabet and adapting it to any inscription, and be able to maintain its purity of style.

Next take all of the present *modified styles,* of which there are many, embracing the "freak," "new art," and "eccentric" styles. Study them assiduously and mark particularly the modification; and trace any and all of them to their parent form among the standard alphabets. Cultivate them all. Do not allow yourself to develop a fanatical fancy for any particular style and "work" it to the exclusion of the many others in your repertoire. This would be detrimental to your versatility and would tend toward a narrow, one-sided development of talent and ability.

With the full repertoire at your finger tips, your versatility will have no known bounds. For the amusement manager, you have full scope in the creation of a striking and appropriate "new art" design, extreme in color, line, ornament, and lettering; while for the banker or conservative business house, your analysis of the proposition would dictate something rather conventional and dignified in color, lettering, and ornament. And bear in mind that the conventional styles are always in style, regardless of the vogue in the new-art styles.

Be ever careful when working any of the modified styles of alphabets. Study the modifications closely and avoid confusion in styles that closely resemble each other except in the modification. Remember that versatility is to a large degree dependent upon the serious interpretation of styles.

LETTER FACES

Heavy letter faces in modified styles have been popular with poster and painted display designers for years, and a heavy face letter is usually displayed in the feature or "display line," with

subordinate lettering shown in lighter face, which produces a pleasing difference in the composition when considered as a whole. It is quite easy to overdo styles, hence most, if not all, consistent designers will be found showing no more than two or three distinct styles of lettering in one design or composition, and in many cases confining the style to but one or two.

PANELS

Panels, ornamental and plain, add greatly to performance and design, and it is customary to make use of a grand or "feature panel," created to carry the feature lettering; with the use of subordinate panels at all times optional. If a subordinate panel or panels are introduced, do not follow with still smaller or tertiary panels, as they will have a tendency to make your design look too "spotted."

It is far better to err on the side of plainness and simplicity than by the too extravagant use of unimportant masses, whether in the form of panel or ornament. We are all prone to overlook this important suggestion, and when we do, our enthusiasm leads us to riot and overindulge composites.

ORNAMENT

A consistent and intelligent use of ornament is to be highly recommended. In a general consideration of the subject of ornament, it is commendable to subordinate ornament to lettering, both in color and mass. If an extremely ornate design is created, with overpowering ornament and subordinate lettering panel or panels, it is highly advisable to render the ornamental feature in subdued color value and treat the lettering in strong color value.

BORDERS

Wide borders and deep insets should receive first consideration, as they play an important part in assisting the designer in preserving agreeable surrounding or marginal space; and right here I will recapitulate from my article on spacing, which also occurs in my first book, "Atkinson's Sign Painting":

In the art of lettering we have no fixed mathematical rules. The law is based entirely upon approximates. With the laity, or people outside of the profession, the supposition is that all letters are the same size, formed on mathematical lines. Nothing is further from the truth. All letters are the same size *in appearance.* Technical knowledge and professional skill are necessary to render this result. Some letters must occupy more space, others less, to produce the appearance of uniformity.

It is a good plan to diagram with preliminary "frames" drawn roughly, lightly and freehand. Each frame will represent a line of lettering, later to be filled with the lettering it is intended to accommodate, to its extremities, that is, the top and bottom lines

of the frame ruled with straight-edge or established with snap line, will act as the top and base lines and the short lines or ends of the frame will act as the start and stop of the line of lettering.

By the use of preliminary frames the designer is enabled to establish the position of all lines of lettering in the inscription in primary, secondary, and tertiary masses in agreeable relation to the background space.

A line of lettering on any surface, no matter what style, must have a starting point and a stopping point. Therefore it is amenable to the frame method as suggested, bearing well in mind that a letter cannot be condensed or elongated to the point of distortion. However, the latitude is very wide in both cases before reaching the point of distortion, owing to the many and varied modifications of the standard or fixed styles normal in their proportions. Hence the taste of the designer can be exercised to almost an unlimited degree, in condensing and elongating.

Never condense a letter more than 3/5, and never extend or elongate more than 5/5, and as previously suggested, space lettering close and create proportionate spacing throughout the entire line of lettering. The sole intent is to equalize the open or background space between letters, producing a pleasing effect of approximate space.

This proportionate space must be an approximate only, and is all that is required to get a pleasing effect in spacing.

All round letters should be spaced a trifle closer to each other (such as C, G, O, and Q); and the full space letters, such as B, D, E, H, K, M, N, R, U, S, X, Z, must be allowed more space between them. All open letters, A, F, J, L, P, T, V, W, Y, must be spaced very close, owing to their open shapes.

UNIFORMITY

In order to get the appearance of uniformity throughout a line of lettering, it is necessary to observe the following: In normal or square space letters divide (for the purpose of study) the letter space into fifths, five squares high and five squares wide. For A add 1/5, for B normal, for C normal, for D normal, for E 1/2 of 1/5 less in width, for F 1/2 of 1/5 less in width, for G normal, for H 1/4 of 1/5 less in width, I 1/5, J 1/5 less in width, K normal, L 1/5 less in width, M add 1/5 to width, N 1/2 of 1/5 less in width, O add 1/2 of 1/5 to width, P normal, Q add 1/2 of 1/5 to width, R normal, S normal, T normal in full blocks and romans, 1/2 of 1/5 less in width, in Egyptians, U 1/4 of 1/5 less in width, V add 1/5 to width, W add 2/5 to width, X normal, Y add 1/2 of 1/5 to width, Z normal, & normal.

The same increase and reduction must be observed in elongating and condensing, and in condensed lettering the reduction of L, E, F, H, J, N, and T may be greatly exaggerated without

detrimental effect,—quite the contrary, the effect is pleasing and highly proper.

MAJOR AND MINOR FIFTHS

are used in an elementary way to assist in fixing uniform proportions, and must be abandoned as soon as the student is qualified to lay out and form lettering without their assistance.

A normal letter space is square, and for elementary study and practice is subdivided into twenty-five smaller or unit squares, making the letter space five major fifths high, and five major fifths wide. Now, if we subdivide one major fifth into fifths, we have minor fifths.

On full-face lettering, namely, full block, half block, round block, and Tuscan block, where the vertical stroke is one major fifth across, draw all horizontal strokes one minor fifth less in width than vertical strokes. If this suggestion is not observed, the horizontal strokes will appear clumsy or heavier than the vertical strokes, although in reality they are the same size. The foregoing suggestion will overcome the delusion and will give the letter an interesting and pleasing contour.

GENERAL RECAPITULATION

The one and all-important essential to consider at all times when preparing and creating "copy" for outdoor advertising can be summed up in one little word, brevity. The best displays are short but comprehensive. They lay the essentials clearly before the public. They do not take up time. They do not exaggerate. An artistic display that embodies a clever idea is the one that gets results.

To secure attention and gain a reading is the first duty of *all* advertising matter and applies most particularly and pertinently to the painted display or poster. No timorous, shivering, hesitating paragraph, but big, bold, telling fact, is the scythe that reaps the harvest. You have to catch the public on the fly, so that he who runs may read. The average person gives but a fleeting glance at an outdoor display. There is no time to read a discourse. A few words must accomplish all that can be done.

The name of the article advertised, an illustration of it—by itself or in use—and the fewest possible words as to its merits, must and should suffice. The lettering must be bold and distinct, so plain that no effort whatever is required to read it.

A good display design may or may not be illustrated. Many excellent displays are not illustrated at all, and in such cases the lettering should be of the boldest and most striking character. But a well illustrated display is always a good business-getter, because of its increased attractiveness.

The use of good design is just as important as the copy—

even more essential—because it is the design that must get the attention, the first point in scientific, modern salesmanship.

Many a display is poor, simply because the "composition" is bad—bad for an outdoor painted display. By good composition is meant the consistent arrangement of the several parts of the design with their reference to each other, and their proper effect as a whole. Only an experienced display or poster artist knows how to avoid the errors mentioned. He designs with the full knowledge of how the display will look, and should look, on the boards. He knows what will make a good subject or device for a striking display, and should be more than fertile with correct ideas in that direction.

IV

THE MODERN POSTER AND DISPLAYS

Quoting Herbert Cecil Duce, an acknowledged and widely known advertising expert, the following remarks aptly apply to both painted display and posters:

"The modern poster is encouragingly progressive, and increasingly artistic. Poster designers of this country have learned that simplicity must be the keynote of their work. They remember that the public is not looking for the poster—it must *catch* the eye. Everyone has experienced this eye-arresting propensity —on the railway, in the street—a patch of color or a bold, striking figure makes one turn and look, and the poster has begun its work which repetition completes.

"The color scheme stands first in importance, and should consist of broad, flat masses of strong but harmonious contrasts. The work of the most successful poster artist of today, John Hassal of London, is always a good example of this simple rule.

"Humor is a great feature of American posters, although it has to be carefully used. Whether the old saying that women are less susceptible to humor than men be true or not, it is usually said to be so by poster designers, and therefore, in the work of appealing to the female population, it is more rare than in posters that appeal to men. There are very strong examples to the contrary, however, as in the Gold Dust Twins posters.

"Well designed lettering is another thing to which a great deal of attention is paid, and the aim is to reduce the 'message' where possible, to some conveniently remembered or striking tag.

"No less an authority than Alphonse Mucha, one of the leading artists of the world, who began his artistic career fifteen years ago, first attracting attention with his wonderful posters, declares that the modern poster is a necessity, and that it exercises a pow-

erful influence on the art of the country. Mucha was the foremost teacher in Paris for seven years, and he says that the rise of many an artist from the ranks of the poor is due to the influence of the poster in the days when the poor man's picture gallery was the only source of inspiration to which he had access. 'The art of the street,' as he calls it, is the stepping-stone that has lessons in form and color, which inculcates them insidiously, and which leads inevitably to an interest in art generally.

"A great feature of American and English posters is the use of attractive little child-studies as the central subjects. There are many of these kiddie-based designs at the present time and they have achieved a substantial success. They are used to bring business for all kinds of things, from candy to seaside resorts.

"In England Hassal has done some wonderfully funny little children, and it will be remembered that England's practically original big art poster, 'Bubbles,' was a study of a small lad in a Lord Fauntleroy suit of clothes.

"In this country the Gold Dust Twins are as popular as Mutt and Jeff cartoons. Women learned to love them many years ago. The little fairy that advertises Fairy soap, the delightful youngster in his suit of pajamas racing against a Fisk tire, the Snow boy, the Dutch Cleanser, the Dutch Paint lad, the Uneeda youngster in his sou'wester, the little butter lovers used by the makers of Meadow Gold, and scores of others, all bear testimony to the wisdom of that appeal to the common instinct of all mankind—the love of a little child.

"Women, too, bulk largely upon the poster boards. Mrs. Baker, and a host of younger divinities, are used to advertise everything from chewing gum to railroads. The Baker's chocolate poster is the only poster that survives out of the famous works of the Beggerstaff Brothers, which made the hoardings glorious fifteen years ago when the two now famous members of the New English Art Club collaborated in the production of posters of the highest artistic importance.

"The human side of the poster is the most important, for it appeals to everyone.

"Among the most interesting landscapes that spring to mind are the wonderful western scenes issued by the Anheuser-Busch Brewing Company, the famous trademark of Carnation milk—'From contented cows,' Moxley's Butterine, and many others.

"One cannot help being struck by the wonderful improvement in poster design made during the past few years. It is true that one hears more of the old poster artists of other days than we hear of the designers of today, but that is because they were pioneers. They were introducing a new thing, and novelties always create curiosity. The highly decorative work of Cheret, whose attention was confined mostly to theatrical posters; the weird and startling effects of Beardsley, or the more commercial

atmosphere given by the Beggarstaff Brothers will live down the ages, because these men were marking out the paths through the unexplored region and pointing the way for the alliance of art and commerce, which has grown to such conspicuous proportions today.

"Artists, too, are beginning to understand that there are great rewards, and fame to boot, in the realm of poster design, and there is a breaking down of the prejudice that existed formerly, which was largely a matter of pose. The unknown artist of slight achievement, desiring to impress the public with the fact of his own attainments through a criticism of the first thing he saw which he felt he could safely attack without stirring the ridicule of older and wiser heads.

"There is every prospect that the art of the billboards will continue to improve, because of the multitude of artists who are constantly bringing new ideas and adding to the attractiveness of the boards with better draftsmanship and a wider and clearer knowledge of the possibilities and mission of the poster.

"Perhaps there are not as many names of designers that fall familiarly on the ear as there were in the days gone by, but that is because the lithographers have learned the wisdom of advertising their own product rather than the artist, which latter course only served to create ruinous competition for the services of the expert."

V

REFERENCE MATERIAL

The ambitious student will not be at a loss for reference material; and getting back to the general contention made with regard to the influence lithography has had upon painted displays, especially in the matter of illustration, he has but to look about him to find an inexhaustible mine from which to glean and gather inspiration. The current magazines fairly teem with clever art, by the foremost artists of the time; a few dimes expended will place him in possession of a choice and extensive collection of art subjects, easily adaptable to display advertising design.

However, they will be as nothing in your hands if the ability to draw and render in color is not developed. Now, then, if you are a commercial sign painter, or an "automatic" letterer in a bulletin studio (and we have many such in the big city studios), do not aspire to the sketch man's stool until you can draw and render the human figure in miniature and on a large scale of reproduction, in any pose. This will, of course, include partial

figures and heads, street scenes, and architectural subjects, making a knowledge of the principal rules of perspective imperative.

You must be able to draw cartons or packages in true perspective, true to life, from life, or, in other words, from the package itself, as it often happens that there is no precedent "copy" either in litho or photo, and it is up to you. No guessing goes, and any of the "nearly right" stuff will not suffice. Mechanical objects, such as automobiles, big tires, and accessories, will contribute to your discomfiture if you cannot handle them.

Animal figures come in for serious consideration and should be anatomically correct; and in the matter of cows and horses your work will frequently have to pass the critical judgment of a veterinary, who as a rule does not know the first thing about art, but does know positively every bone and muscle in the domestic animal.

Many good studies can be picked up here and there in the regular way, from faithful reproductions of Rosa Bonheur's famous "Horse Fair" all the way down the line. Coupled with all this, you must acquire facility with water colors in "wash" and opaque styles of rendering.

Happily, your ability as a letterer will enable you more readily to seize upon your sketch problem and make your advancement more rapid than if you were less fortunately equipped.

The Educational Division of this work is seriously intended to equip you with essential knowledge, without which you are and will be seriously handicapped. For instance, if you undertake a head or figure and use as a study the first magazine cover that strikes your fancy, and proceed to render it in two or three paintings, as suggested in the Educational Division, pursuing the same procedure until you are rewarded with some measure of success in later performances, you will be the better equipped to reduce the performance to but one painting (as required in commercial art) with a reduced or abbreviated palette. The shortest way is the longest way around, which you can prove to your entire satisfaction if you take the contents of this book seriously.

VI

IN THE BULLETIN STUDIO

The designing equipment suggested in the Scenic Division will amply answer for display designing.

The logical coating for bulletins is *white,* for several obvious reasons, principal among them being the facility and ease that follow in the manipulation and execution of bulletin painting, regardless of color and design.

On a flat white ground the artist has full freedom, with no annoying under color, which at all times will cause more or less trouble.

Deep lead color unquestionably is the worst of all, and it is almost a physical impossibility to render a pictorial on dark lead, without extra effort in holding the key and repeatedly correcting false color values, caused by the dark lead color partially showing through, especially in the higher values and flesh tints. A successful pictorial can be accomplished, but at an increased cost to the plant.

Deep lead colored coating also offers impediments when the lettering is considered; when white or tinted lettering occurs on the design, it requires more care in "breaking on" the white and the tints, therefore more time, and increases the cost.

On "repaints," the foreman or super who graduated from the carriage paint shop into the display advertising business might insist upon "coating out" bulletins with deep lead color, arguing that by so doing he is successfully covering out the former design, stopping any red that may be on the board from "bleeding" through, saving a second coat of lead and the cost of applying it. Granted, but, with an increased cost of production and incidental annoyance to artist and letterer. This increased cost will more than overwhelm that of additional coating and the cost of applying it by the lowest priced labor in the studio.

On the large plants there is no effort made to treat galvanized iron with preliminary "acid wash" to insure durability; for the good and sufficient reason that the service does not demand it. Big city bulletin service gives three to four repaints a year on annual contracts, making durability procedure unnecessary. The bare iron is primed in white lead, broken in half-and-half boiled linseed oil and turpentine with a small quantity of pale japan to harden the coating over night; followed with a "flat" second coat of white (lead) broken and thinned with turps only—no oil.

PAINTING GALVANIZED IRON TO INSURE DURABILITY

On smaller plants in smaller cities, where one painting per year is the rule, and where maximum wear is desired on highway and railroad bulletin service, it is well to treat galvanized iron as follows:

Take a five-gallon carboy nearly full of water, in which dissolve three-quarters of a pound each of chloride of copper, sal ammoniac, and nitrate of copper; when these ingredients are thoroughly dissolved, add three-quarters of a pound of crude hydrochloric acid.

Use a wide kalsomine brush in applying this mixture, and the next day take a wad of burlap and rub off the gray "bloom." Have priming coat very thin and rub out well, using raw linseed

oil and turps half and half, with red lead, Venetian red, or white lead.

Subsequent coats:—Second coat with white lead broken in half-and-half boiled linseed oil and turps. Third coat with lead broken in turps only.

On Repaints:—Thin shellac all reds before coating in, to prevent "bleeding" through.

POUNCE PATTERNS

A pounce should be drawn for all pictorial work on a bulletin contract. Heavy detail drawing paper will answer for most ordinary contracts. It comes four feet wide and is very tough and durable; and has a fine surface, taking charcoal and lead pencil well on account of the ribbed tooth.

Heavy manila paper will answer, but has a smooth surface not as agreeable to work on.

If a more durable pattern is wanted, sign cloth can be used if well shellaced with two or three coats after the drawing is completed and before perforating the pattern.

Bulletin pounces should be carefully perforated with a large size perforating wheel having rather blunt teeth, in order to have perforations that will not fill or clog easily. It is almost unnecessary to suggest that all pounces should be scaled drawings, following the same procedure as suggested in the Scenic Division.

AFTER POUNCING

Proceed to "indelible" all the lines of the drawing, using an ordinary indelible pencil. Lettering also is retraced with the indelible pencil, after being laid out roughly in white chalk and corrected in charcoal. Flog the board with your "cat-o'-nine," clearing away loose chalk and charcoal.

VII

PAINTING THE PICTORIAL

In the Educational Division you have been directed along pure and sure academic lines of procedure, for the purpose of equipping you with necessary and serious art knowledge. Without this knowledge one is more than handicapped, but the possession of it positively removes uncertainty of action and at once paves the way to the intelligent interpretation of a pictorial problem or composition, and enables one to abbreviate palettes and reduce the performance to but *one painting,* which is the result demanded in almost all branches of commercial art, particularly bulletin art.

BULLETIN AND GENERAL PALETTES

For your guidance I will herewith give you three reliable palettes, that will suffice for any commercial art problem.

GENERAL UTILITY PALETTE

Blue Group

Placed at the extreme left of the palette along the outer edge, starting with:

Black (ivory).
Asphaltum.
Payne's gray.
Mineral blue.
Cobalt blue.
Mauve lake.
(Leave a little space.)

Yellow Group

Raw umber.
Raw sienna.
Yellow ochre.
Orange yellow.
Medium yellow.
Strontian yellow.
Brilliant yellow.
Brun rouge.
(Leave a little space.)

White (generous quantity).

Red Group

Vandyke brown.
Burnt umber.
Burnt sienna.
Light red or Venetian red.
Alizarin crimson or red lake or carmine or geranium lake.
Light English vermilion.

To the extreme right of the palette place—

Emerald green; light chrome green, medium chrome green; emeraude green.

Leave a little space and finish the setting with "juice lakes."

Italian pink.
Yellow lake.
Transparent ochre.
Flesh ochre.

For "Juice"
Use ochre, Venetian red, mineral or cobalt.

This little group is fine for "juice" shadows and glazing.

FOR "TONE" IN LANDSCAPE

Mix highest sky value with white, touch of "juice" and add more red, yellow or blue as per the value and its *color quality.*

Use highest sky tone for admixture whenever *local values* and *high values* are wanted.

Water and reflections should be "juicy."

High lights and reflected light on solid objects should be opaque.

The edges of values may be softened with a dry brush or blender if desired; however, this will not be necessary if the values are well rendered. The general effect will be more crisp in feeling if blending or softening is omitted, as sufficient softening can be accomplished when rendering the values, if extreme care is taken to keep "dry surface" under practically all of the values—*that is the secret of keeping values clean and crisp.*

FOR HEADS AND FIGURES CLOSE UP

Tone is dispensed with and the local flesh is keyed according to the suggestion on key to be found at the beginning of the Educational Division.

Note:—In this palette you have noticed quite a number of colors which in academic training you are taught to repudiate on account of their poisonous and fugitive qualities. These precautions can be to a certain extent waived in almost all commercial art work; for instance, in work for reproduction, poison and fugitive qualities do not manifest themselves for some time after completion of the work; it oftentimes requires several weeks and often months before any great change is noticeable in the painting. The same can be said relative to bulletin painting.

NO. 1 BULLETIN PALETTE

Blue Group	*Yellow Group*		*Red Group*
Black (ivory).	Raw umber.	*White*	Scarlet lake.
Mineral blue.	Raw sienna.		Light red.
Cobalt blue.	Yellow ochre.		Alizarin crimson.
	Strontian yellow.		Pale Eng. vermilion.

NO. 2 POPULAR BULLETIN PALETTE

Blue Group	*Yellow Group*	*Red Group*
Black.	Brown ochre.	Burnt sienna.
Ultramarine blue.	Brun rouge.	Venetian red.
Cobalt Blue.	Raw sienna.	Carmine No. 40.
	Golden ochre.	Red lake.
	Lemon chrome yellow.	Pale Eng. Vermilion.

White between the yellows and reds.

This is a fine abbreviated palette, with no fugitive color and only one poison, the lemon chrome, which does not materially matter. It is a fine palette for large heads, full or partial figures, landscapes in full color, or poster effects, etc.

PALETTES (GALVANIZED IRON)

For palette, use galvanized iron sheet 14 inches by 30 inches. Have several of them, so that no time is lost during the day cleaning them, as they fill up with color. It is a part of the stock boy's duty to keep a supply of palettes on hand, and as the soiled or dirty palettes are turned in he quickly rinses them clean with an old worn flat brush, holding them over a small benzine trough made for the purpose.

When using palette, it is kept flat on the stage with the color tray alongside.

COLOR TRAY

The color tray in use in all large bulletin studios is shallow—14 inches by 24 inches and 3 inches high. This size tray will comfortably hold either No. 1 or No. 2 Bulletin Palette in one-pound cans. The colors should be arranged in the same order in the tray as given in the "palette setting," and then no confusion can arise; it being purely optional with the artist whether he dips into the tray colors or deposits small heaps upon the palette in the order of sequence given. The majority prefer, however, to "set" the palette, renewing colors from the tray as occasion demands.

BULLETIN KIT

(For outdoor work on bulletins that are permanent and cannot be brought to the studio for painting.)

Construct a strong box or chest 36 inches long, 16 inches high, and 14 inches wide. Let the color tray into the bottom and have it slide in like a drawer; provide it with a strong lock and have the drawer beneath a tight inner or false bottom. This will insure a clean color tray at all times. Partition the inside of the chest, making a pot compartment 12 by 14 inches; the remainder of the space can be used for the accommodation of the bulletin falls and hooks, also stirrups and spurs. Wall a narrow space in front for palette storage.

RINSING POT

A rinsing pot can be easily made from an ordinary paint pot by suspending loose-fitting wire screen a third of the depth of the pot, by means of bent narrow strips of galvanized iron or stout wire, bent at right angles to hug the inside wall of the pot, following up the side, and the ends bent over the edge to hook; can be quickly taken out when pot needs cleaning, which is often.

BRUSH POT

This is made the same way, except that the strainer is suspended to within two inches of the bottom. The strainer will keep the brushes up out of the muck and can be quickly cleaned, same as the rinse pot.

BRUSHES AND IMPLEMENTS

All of the larger sizes of bristle brushes listed in the Educational Division indiscriminately, are required, with the addition of ½-inch, ¾-inch, and 1½-inch chiseled artist's bristle, and a few 1½ and 2-inch chiseled flat bristle, known to the outdoor fraternity as "cutters"; also a couple of 3-inch flat bristles and a 4-inch flat bristle.

Each brush should be wrapped in paper envelope, carefully rolling the paper around the hair, conforming it to the shape of the brush, bending end of paper sharply at the point, and taking extreme care that the fold occurs one-eighth inch beyond the point of the hair. Keep standing in brush pot containing turpentine. The paper wrappers keep weight of handles off hair and keep the brush in the pink of condition, points always sharp and elastic. Letterer's brush kit is taken care of in the same way.

The long porte-crayon described in the Scenic Division is also a very handy implement in the bulletin studio; it answers for preliminary blocking in both pictorial and lettering. The bow snap-line is another indispensable tool that cannot be too fully appreciated in the bulletin studio; it is fine for single-handed operation when short lines are wanted.

The long curved edge is another important implement, and is fine for running serious "lining" on the curves; the variety of straight edges recommended in the Scenic Division will be found handy at all times on bulletin painting.

A LARGE SPACE IS IMPERATIVE

Too serious attention cannot be given the importance of having a large and unobstructed wall space, perfectly smooth, for the purpose of drawing in pounces with facility and ease. It often happens on restricted space that one or more vanishing points that occur out of the plane of the picture (as they are bound to do on large objects, such as buildings and cartons) become annoying, and recourse must be had to the plan suggested

in the Scenic Division, which is commendable although consuming additional time. This can be obviated when space is available in which to fix the vanishing points. Too little attention has been paid to this important detail by even the large plants, when building a studio or remodeling a building to suit the requirements. Floor space can be utilized, but in the average bulletin plant practically all of the floor space is taken up with the bulletin racks.

VIII

PROCEDURE IN PAINTING

IMPORTANCE OF GOOD DRAWING

Very frequently the bulletin artist is required to work from a rough sketch, that is, a sketch which pressure of time has prevented from reaching a more serious stage. The versatility and co-operation of the artist working in the studio is depended upon to produce equally as good a result as that attending reproduction from a seriously executed sketch. This is quite a common occurrence in any of the big plants, where there is at all times a tendency to curtail in the production of sketches, especially working sketches, the pictorial feature often receiving abbreviated treatment, relying upon the artist in the studio to supply detail. This phase of display advertising operations cannot well be regulated by either sketch artist or studio artist; it therefore is very pertinent that thoroughness in drawing be cultivated, which will eliminate the handicap.

THE SURFACE OF THE BULLETIN

When properly coated the surface possesses very little, if any, suction; and on account of the absence of suction the following suggestion is of vast importance, especially to the beginner when starting to render pictorially upon this kind of surface.

"Dry" surface under the brush is essential. Planes and masses should be rendered in desired value and quality throughout the major portion of the pictorial. Introduce each plane independent of its neighbor and avoid encroaching upon a neighboring plane or mass that is of necessity different in both color and value. Treat each independent of the other. Follow with a slight softening of the edges of the planes, and you cannot help succeeding in maintaining both color quality and key.

In the minor portions "lay-in" may be resorted to with successful results; to accomplish this greatly reduce the amount of oil used for vehicle, and force the lay-in to set reasonably quick, by making a free use of gold size and benzine for thinners. The

quick setting of the lay-in will then permit scumbling, which must be executed quickly and surely, with the least number of strokes possible. Failing in this, muddiness will result and the scumbling will have no meaning.

PROCEDURE

Begin by rendering your shadows lightly, taking particular care that no *white* be permitted to glide into them. It is the poison or false note of a picture, except locally and in the lights. If once your shadows are corrupted by the introduction of this baneful color, your values will no longer be warm and transparent, but heavy and leady. It is not the same in the lights; they may be loaded with color, as much as you may think proper, providing the values are kept pure. You are sure to succeed in placing each value in its place, and afterwards, by a slight blending of the brush or pencil, mellowing them into each other without tormenting them; and, on this preparation, may be given those decided touches which are always the distinguishing mark of the great master—yes, *master;* we enjoy the distinction of claiming many modern "masters" in the painted display advertising field.

The foregoing has reference to low-keyed heads, in which the shadows are more or less intense, and you may wonder what to do with a high-keyed proposition. In this case it is to be borne in mind that a head in high key would naturally be affected by a uniform lighting; the only shadow existing would be under the chin, and a suggestion of shadow under the lip, under the nose, and at right or left of nose—under the eyes or around them, according to the lighting (which should never be directly in front, as it will contribute to "flatness").

(A head or figure should be lighted from below, above, or from either side, never from direct front.)

The coloring in a high-keyed head is practically a combination of local flesh, high lights and half-tones or demitints, strong accents of shadow being introduced to strengthen the modeling and prevent the much despised flatness.

LARGE HEADS AND THE ADVANTAGE OF RAW OIL

Raw oil has a decided advantage over boiled oil, especially if the boiled oil is poor in quality. Large heads as a general thing are not painted as broadly as the smaller ones, taking into consideration the mammoth heads that are often displayed on the boards, where they run in sizes from three or four feet up to eight and ten feet. If boiled oil is used on a big head as a vehicle in a warm studio or during the summer months, it will be quickly discovered that it sets too quickly for the subsequent blending or softening necessary to produce a smoother technique; and when this is attempted it will be found that the color has become very gummy and will not yield to manipulation without "piling" badly

and producing muddiness. This is a very discouraging feature and can be entirely overcome by using raw linseed oil as a vehicle.

LANDSCAPES AND ACCESSORY BACKGROUNDS

These can be treated as suggested in the Educational Division, except that the result is attained with but one painting, which makes it imperative to bear constantly in mind what has been said of the absence of suction on a galvanized iron bulletin; the same care must be exercised.

Poster pictorials, that is, pictorials rendered in poster style, must receive the same careful observance, regardless of subject. Quite one-half of the pictorials upon the boards are in the many and various forms of the popular poster style, which has been a great craze for a number of years past. Though originally adopted from the Japanese, present examples express the development by European and American artists and only in the most remote way suggest early Japanese influence.

VIII

COLOR COMBINATIONS

Where color is used for letters, ornament, lines, etc., black or dark colors should be used on white or pale tinted grounds, and *vice versa*. In color schemes, care should be taken to have tones in harmony, complementary, or in decided contrast.

Agreeable color differences are always in order in display painting; for example: On a dark green ground, use white or lemon tint, or monotone tint, monotone to the ground. On a pink ground, use black or deep rich red. On deep blue, use white or delicate blue tint (monotone) or pale pink.

When more than one color is to be considered, the following combinations will be found valuable:

TRI-COLOR NEUTRAL

Ground	*Letter*	*Shade*	*Scroll*	*Border*
Black	White	Dark gray	Same as shade	White
Black	Light gray	White	Dark gray	White
White	Black	Light gray	Gray	Gray
White	Gray	Black	Gray	Black
Light gray	White	White	Black	Black
Dark gray	Black	Black	Black	White

To soften contrasts on gray grounds use very pale or very dark grays instead of black and white.

WARM COLORS

Ground	*Letter*	*Shade*	*Scroll*	*Border*
Red	Pink	Carmine	Carmine	Pink
Deep red	Pink	Red	Red	Pink
Yellow	Dark olive	Orange	Same as shade	Dark olive
Orange	Dark red	Yellow	Same as shade	Red

COLD COLORS

Ground	*Letter*	*Shade*	*Scroll*	*Border*
Blue	Deep blue	Light blue	Deep blue	Light blue
Deep blue	Very light blue	Blue	Blue	Light blue
Light blue	Very deep blue	Blue	Blue	Deep blue

STRONG CONTRASTS

Ground	*Letter*	*Shade*	*Scroll*	*Border*
Light green	Black	Red	Red or black	Black
Yellow	Blue or black	White or orange	Same as shade	Black
Pink	Very deep green	White or red	Same as shade	Deep green
Black	White	Orange or red	Green	White
Red	White	Black	Black	Black or white

Greens are treated the same as blues. To strengthen contrasts in cold blues or greens, use black and white for lettering instead of very light or dark color.

IN GENERAL DESIGNING

It is customary to confine bevel effects, double outlines, and all ornate effects in tint and color to the feature or display line; all subordinate lettering being shown in strong contrast minus any embellishment aside from single outline, or outline and shade, or shade alone, or plain (no shade or outline). This simple rule overcomes the tendency to overwork a design and leaves the small lettering unincumbered and legible.

Borders can be treated in an almost infinite variety of effects, —wide beveled in two or more colors; conventional scroll, modeled in relief and usually in gold or brass effects; bronze tablet effects, with egg and dart molding rendered in verde antique effects; ornamental insets or matt lines with ornamental corners; conventional floral borders; lattice-work border with natural flowers entwined; or natural fruits are shown.

Backgrounds are also quite diversified, the plain or one color being most in favor. Then we have blended grounds in tints, to serve for dark-colored lettering, and *vice versa*, in dark or medium

colors to serve white and tinted lettering. A plush effect is fine and should be confined to deep or medium colors, such as reds, blues, tans, old gold, greens, and purples.

Broad white outlines (poster style) are used to give dark lettering clearance or additional force when the lettering occurs upon medium value grounds, such as Armour or Bull Durham yellow, orange, blended tints, landscapes in natural or poster style, and where the lettering sometimes crosses part of the pictorial when neither landscape nor blended ground.

White outlining should be very, very heavy, flat white, to which is added a mere trifle of boiled oil, a scant tablespoonful to one-pint lettering cup two-thirds full of heavy flat lead.

The term *heavy* applies to the consistency, when mentioned in connection with color, having no reference whatever to the literal weight.

Lettering mixtures for all dark surface lettering, including "cutting-in" color, should be broken stiff or heavy in oil. This will give a very agreeable mixture working freely and speedily.

Cutting in is the term applied to the formation of a letter by forming it with the background color, as in the case of general bulletin lettering where the ground is black or any dark color and the lettering is shown in white and tints. In such case it is customary to "break on," that is, after the layout is completed and traced indelibly, the flat white or flat tint is applied to each individual letter, roughly overcrowding the layout in order to make sure of having a well broken-on layout. Crowding the coating beyond the letter outlines a trifle gives freedom and latitude in *"cutting in."* The flat white or tint alluded to is broken and thinned with turps, with a little japan gold size added to hasten setting and drying.

After the "break-on" is set sufficiently the lettering is "cut in" with the background color, which is a simple operation when performed by the expert letterer; cut-in lettering can be executed more rapidly than "surface" lettering, because of the smaller number of strokes required to produce the finished letter.

Surface lettering is the reverse of cut-in lettering, and the execution of the letter is confined to the letter itself. All lettering upon white or pale tinted grounds is surfaced on, and all white or tinted lettering upon black or dark grounds is cut in.

The difference in the two methods can be clearly demonstrated if you take a small sheet of white drawing-paper and swing a two or three-inch circle on it, which will represent a period (or full stop). To show it black on white, you quite naturally will proceed to outline it in black and fill it in solid, giving you a black spot on a white ground. To cut it in, you will surround the spot with black, leaving the white exposed inside of the circle. Filling in the rest of the background with black will give you a white spot on a black ground.

IX

WALL ADVERTISING

Wall ads are treated according to the following: If new or raw wall, break lead for lettering in half-and-half oil and benzine. This will "set" quick enough to permit "cutting in" with the background color in a few minutes. On "repaint" walls, break lead in benzine only.

All white or tints on wall work should be double-coated. Benzine permits this, as it sets the lead sufficiently and makes it possible to repeat coating in a few minutes, or, in other words, the break-on can be double-coated as fast as it is completed, by starting at its beginning on each stage length or stretch.

On big lettering the break-on is accomplished a "drop" at a time, until the bottom of the letter is reached (if not over ten or twelve feet in height) and double-coated by pulling up over the stretch. On extremely large lettering this plan is not followed, as it then causes too much pulling and hauling on each stretch. It is then better to break-on and finish each "drop" unless there is some doubt as to how you are coming out on the formation. If there is any doubt, it is best to complete the break-on before double-coating.

When double-coating apply with as little stroking as possible to avoid rubbing up the break-on.

Also bear in mind that a real advertising artist, when charging his brush, does not drag it across the edge of the pot or pail to rid it of surplus load. Instead he bats the brush from side to side inside the pot, or against one side with a slap or two, never a drag or wipe over the edge. Bear this in mind—it might save you some embarrassment later on.

A big wall, either commercial or advertising, is never attempted without a scaled sketch for both pictorial and lettering, although the average artist on displays requires but the one sketch for all sizes and shapes of walls. This sketch remains a guide as to color and style and is accompanied by a working sketch which shows various shapes of walls and transpositions from the approved sketch.

RULE FOR DETERMINING FOCAL POINTS OF AN ELLIPSE

Almost all careful and particular wall men resort to the elliptical plan of forming immensely big round letters such as C, G, O, Q.

The major diameter is the long dimension and the minor diameter is the shorter dimension, crossing the major midway and at correct right angles. To determine focal points quickly, take one-half of the major diameter and set its end at either one of

the extreme points of the minor diameter, and proceed to swing the major half across the major diameter at each end; the points of intersection will be the focal points. Set a nail at each focal point and a temporary nail at the extreme end of the major diameter. Take a piece of light copper wire and make it fast to focal point nail, pass the wire around the temporary nail and make fast to the other focal point nail; then pull the temporary nail and insert an indelible pencil in its stead. Then describe the ellipse by keeping the wire taut and moving the pencil forward at the same time.

Note:—The ends of the wire being made fast to the focal posts, prevents the loss of the wire, which is a decided advantage on a wall. A loose loop cannot be kept to place on a big ellipse when in a vertical position, although answering very well for small ovals in the studio.

MORE ABOUT SKETCHES

The average plant owner's wail is, that after a colored sketch gets into the studio it seems to be a physical impossibility to keep it free from spattering, and it gets back to the sketch file in a badly soiled condition. This is very true, but it is about as easy to keep an unprotected sketch clean in the studio as it is to go out and run down a wall stretch in a full dress suit and then expect to appear at a formal function in a well-groomed condition as soon as you pull up safe and get your brushes wrapped.

A serious colored sketch costs all the way from $6.00 to $40.00, and forty cents' worth of clear celluloid and three cents' worth of paper fasteners would cover it, and make it possible to keep it clean while working from it, without having to exert a special effort to keep it clean and incidentally lose time in doing so. Celluloid covering has been in vogue among the big plants for a long time, with the result that sketches are kept in good condition.

A live sketch artist usually supplies celluloid covering with scale lines ruled and numbered in India ink, which is a great convenience, saving much time and annoyance in the studio.

POUNCE PATTERN HANGERS

Provide narrow half-inch strips, full length of the pounce, and clamp the top edge of the pattern between them, using short stove bolts with thumbnuts. Hang by means of strap iron hooks, bent at right angles, bolted to the strips. The hooks should be wide enough to hang over the top beam of the bulletin rack. By having a small ring fastened in the top of each hook, the pattern can be hung from studio floor, lifting it by means of a long stick with a small hook in the end to engage the rings in the pattern hooks. In this way one man with two long sticks can manage a large pounce alone with ease, shifting it quickly from one board

to another. A curtain pole in the bottom edge of the pattern will be found a great advantage, as its weight will keep the pattern flat when suspended, and it also provides a roller for the pattern when in storage.

X

MURAL PAINTING

It will frequently happen that a scenic or bulletin artist will be called upon to execute a mural decoration, and this should offer no embarrassment, as murals come conveniently within your scope, accustomed as you are or will be to large compositions, so that the drawing-in and rendering will be the least of your difficulties.

A convenient and agreeable method is found by mounting a piece of decorators' cloth somewhat larger than the size of painting desired. After mounting, give coat of strong glue size; when dry it will be nicely strained. Follow with a prime of very pale ochre tinted lead-mixed and thinned with one-third oil and two-thirds turps. Lightly sandpaper, which will cut down the small knobs, and then proceed to draw in and render in semi-flat oil color.

When dry cut the canvas off the stretcher and hang in position on the wall with *mural paste,* made as follows:

Dissolve 1 pound cabinet glue in two gallons of water. Add to it while boiling enough of the following to make thick paste: 5½ pounds wheat flour, half-pound caustic soda, half-pound sulphate of ammonia. Strain and add while warm one-eighth pint of Venice turpentine.

Apply to back of painting lukewarm. Place in position quickly and roll into perfect contact with a paperhanger's roller. The wall must be free from suction. The space should be previously painted or sized in wall varnish and allowed to become bone dry.

In a day or so apply a coat of corn-starch size to the face of the painting, which will give it a pleasing dull or flat effect and incidentally keep and preserve the painting. This size should be washed down once a year and renewed.

The plan of operation suggested permits the artist to produce mural painting in his own studio. A few large and small size working stretchers will equip for murals, and can be used repeatedly.

Mural painting subjects are confined to two classes, historical and allegorical, and it is well to be constantly on the lookout for subjects and compositions that will lend themselves appropriately. The field is widening and murals should receive

serious thought, from the fact that there is no one better equipped than the scenic or bulletin artist to undertake this most interesting phase of art, owing to the aptitude developed for big masses and a large, strong, vigorous style of drawing.

If your mural canvas is too large to hang easily in one piece, cut it up into convenient sections before hanging. When ready to cut, do it with an irregular, zigzag motion, which will make a better joint and one more easily registered on the wall than a smooth cut in a perfectly straight line. A single trial will prove this. The irregular cut will not be discernible, whereas a straight cut would be difficult to hide, even though well butted.

XI

A FEW FINAL TIPS

To keep *orange mineral* in suspension, add a few handfuls of bolted whiting to the pot; ditto with any dry color that is pot-mixed, outside of black.

It is customary to use a one-inch narrow strip, planed on all sides, on which to indicate *up-and-down measurements,* as taken from the position of top and base lines on the bulletin sketch, including border and inset lines. The stick is then placed vertically at one end of the board and the marks transferred to board surface in exact register. Repeat at the other end of the board. This transfers the positions to the board and it is then "snaplined."

If the sketch is scaled to 12 feet high and you encounter a 10-foot board, you do not have to resort to a mathematical calculation to transpose the sizes to adapt the 12-foot up and down to 10-foot. Merely slant the stick until the border marks on the stick register with the edges of the board, hold firmly in this diagonal position, and proceed to indicate the marks to correspond on register with the marks on the stick.

To correct mistakes, remove color with an oily rag and follow with a wash of soap and water.

Automatic brush.—Take any size flat bristle brush or fitch and bind it with thin tin or brass and expose the hair ⅜ of an inch; fasten the tin with a small tack or two, driven into the handle. The brush selected should be unchiseled, and if this suggestion is followed, you will have a wonderful tool little appreciated by many. With it you can run fast lines uniform in width, regardless of pressure. Charge by stamping in color laid on palette. It is also a great brush for circles and ovals, when held in position in the loop of a tautened string. Try it and you will

be surprised, and wonder why you did not take to it sooner—it will help you get the money more easily.

A cheap and durable *white* for barn and fence advertising can be prepared by using two-thirds white ochre (dry) and one-third ground white lead. Break up the ochre stiff in oil and then add the lead. Use benzine for thinners.

XII

RECAPITULATION

I have been frequently solicited to prepare a quick method or system whereby one could quickly master bulletin pictorial painting.

These requests are based upon a very superficial or abstract view, held by many who deem a short trail possible for them, and one that will eliminate a serious, prolonged study, which as a rule entails at least a few years of time and much self-denial.

The answer to this sort of ambition is simple, and I repeat, "The shortest way to the acquirement of artistic skill and knowledge is the longest way around," through academic methods and continuous practice in drawing and painting.

There are two somewhat different temperaments represented in artistic endeavor. One who acquires skill and artistic ability very quickly, and is quite aptly termed a genius, represents one temperament; while one who acquires skill and knowledge more slowly is termed a plodder, and represents the other temperament. With an equal start and both favored with equal resources in academic training, it naturally follows that the genius will outstrip the plodder in point of time, relative to attainment.

The genius, by reason of his great natural talent, makes phenomenal and rapid advancement, due in great measure to his impulses; to keep up with them, he works tirelessly, regardless of the fact that everything in art comes easily for him, and he enjoys distinction and success early in his career.

The plodder acquires ability more slowly, but just as surely, and eventually shows up very strong, achieving his full measure of recognition.

My endeavor has been to make the contents of this book just as plain and simple as possible, and I anticipate and sincerely hope that it will receive the indorsement and support of the many desirous of greater knowledge, as well as the approval of advanced professional and finished artists.

I shall take advantage of this opportunity to express my sincere appreciation of the benefits enjoyed in my personal con-

tact with many artists of the present time, who have won a well-deserved place in the art world. Notable among these, I will mention the names of Wellington J. Reynolds, instructor Chicago Academy of Fine Arts; D. H. McInerney (deceased), for many years superintendent Thomas Cusack Company, Chicago; Charles Busack, chief designer at Cusack's; Lawrence Mazzanovich, noted Chicago artist with a studio in Paris, who by reason of his great ability has won the appropriate title of "the modern Corot"; E. W. Davis, chief designer, R. C. Maxwell, Trenton, N. J.; Frederick J. Mulhaupt, noted illustrator and instructor in New York art circles, formerly instructor at the Art Institute, Chicago; William Lee, noted animal painter, and for many years chief artist in Tucker Bros.' studio, New York, which specializes in sideshow paintings and circus "fronts"; Elmer J. Birdsall, dean of bulletin artists; James Spurgeon, noted scenic artist, conspicuous for years as a very clever bulletin artist; Hanson Puthuff, noted Western artist and instructor in Los Angeles Art Schools; Harry Fulford (deceased), for many years chief designer The Gunning System, Chicago; O. Meridith, designer, The Gunning System, and Walker Co., Detroit; O. C. Hammond, Louis Hanks, John Karman, Porter Skinner, John Annert, David Lloyd, John Irwin, Willard Clark, James Thompson (deceased), W. D. Tate, William Daniels, Val. Costello, Fred Watrin, Henry Boder, Claude Jackson, Edward Miller, Herman Tieman, Henry Boler, George Olson, Henry Larson, Al. Angermann, Fred Hurdle, William Thompson, A. J. Schmidt, Oscar Amaldus, Frank Nicholson, G. W. Pate, Louis Ritman, E. J. Schneider, Victor Higgins, C. J. Strong, Charles P. Ziemsen, F. L. Vaness, Michael Kob, Roscoe L. Mark, A. R. Hussey, and Charles F. Miller.

To these men I am indebted for much friendly professional criticism and encouragement, and it would be more than difficult to estimate the great influence these men have had upon each other and all who have come into personal contact with them. In their tireless activity they have been a real factor in the development of bulletin and scenic art, and a high standard of "lettercraft" in Chicago and western cities.

For almost a quarter of a century I worked with and among these men, in personal contact with one or several of them at intervals throughout this long period, and my one great regret is that I cannot live the period over again. I am free to confess that whatever progress I have made I owe in great part to the influence and association of these sterling artists; and to them in particular and to all those ambitious to rise in both bulletin and scenic art, I respectfully dedicate this book.

F. H. Atkinson.

Figure 63.—An Interesting Bulletin Design in Flat Poster Style, Striking and Distinctive.

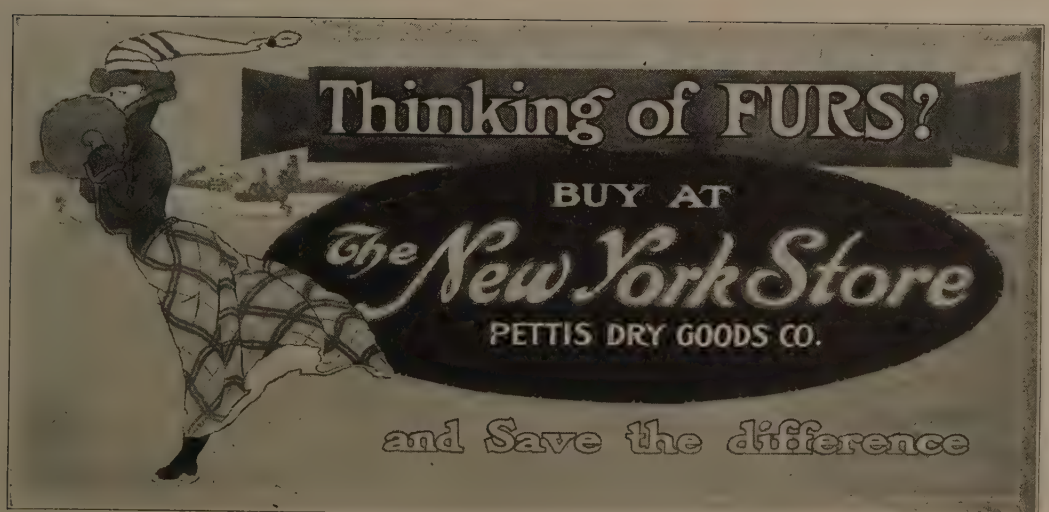


Figure 64.—An Interesting Design in Poster Style.

Figure 65.—A Distinctive Well-Composed and Well-Rendered Serious Art Composition.

Figure 66.—A Rather Odd Distinctive Broken Background is the Attention-Compelling Feature of This Design.

PHONE WALNUT 130
"Perkins Service"
Assures The Prompt Delivery Of
PORTLAND CEMENT
And Courteous and businesslike Treatment from Our Entire Organization

Figure 67.—A Plain and Dignified "Service" Design with the Air Brush Shade.

BURNHAM & MORRILL
FISH FLAKES
FISH FLAKES
For FISH BALLS and CREAMED FISH
The New and Only Way To Buy Codfish
10¢ and 15¢ Sizes
FRESH FROM THE OCEAN NO SOAKING NECESSARY
390

Figure 68.—A Fine Example of Both Pictorial and Lettering Composition Which is Worthy of Very Serious Study.

Figure 69.—A Very Striking and Simple Design in Both Lettering and Pictorial Composition. Exceptionally Well-Balanced Throughout.

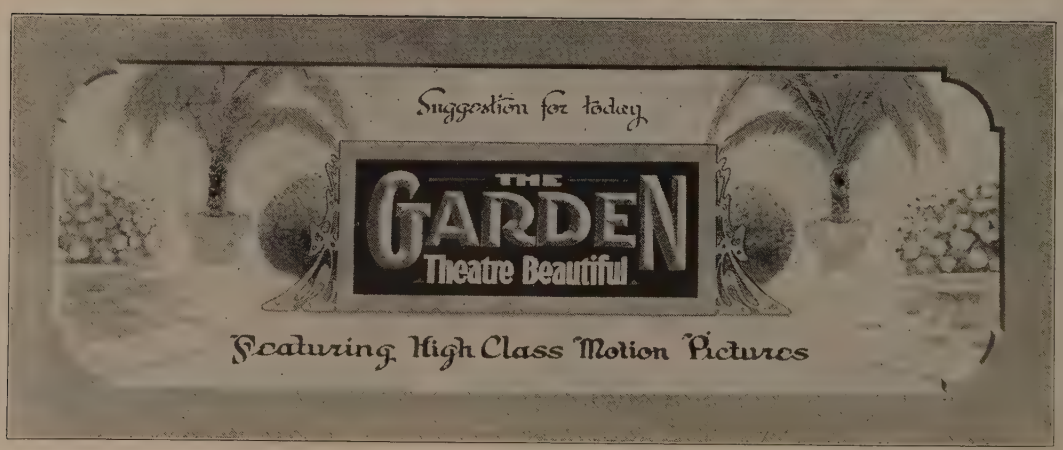


Figure 70.—Formal Garden Rendered in Good Key and Tone Readily Places This Design in a Class by Itself.

Figure 71.—A Good Example Both in Style of Lettering Used and General Composition.

Figure 72.—A Well-Balanced and Agreeable Design. Plain and Pertinent.

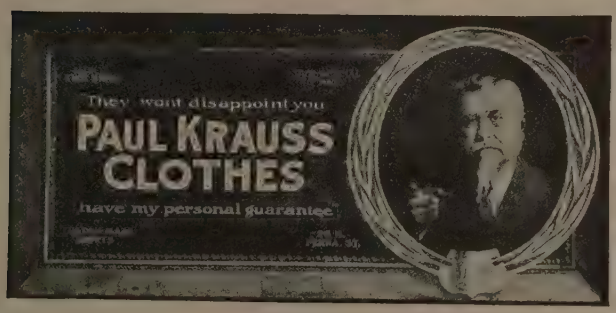


Figure 73.—A Plain and Distinctive Design. Very Agreeable Throughout in Both Lettering and Pictorial Composition.

Figure 74.—A Strikingly Original Design. Unique and Well-Balanced.

Figure 75.—A Well-Balanced and Well-Executed Design.

Figure 76.—Pencil Sketch, Well-Balanced, and in an Agreeable, Plain Style.

Figure 77.—Pencil Sketch, Well-Centered, Well-Balanced Inscription, Coupled with Conventional Fruit Border, Makes This a Very Pleasing Design.

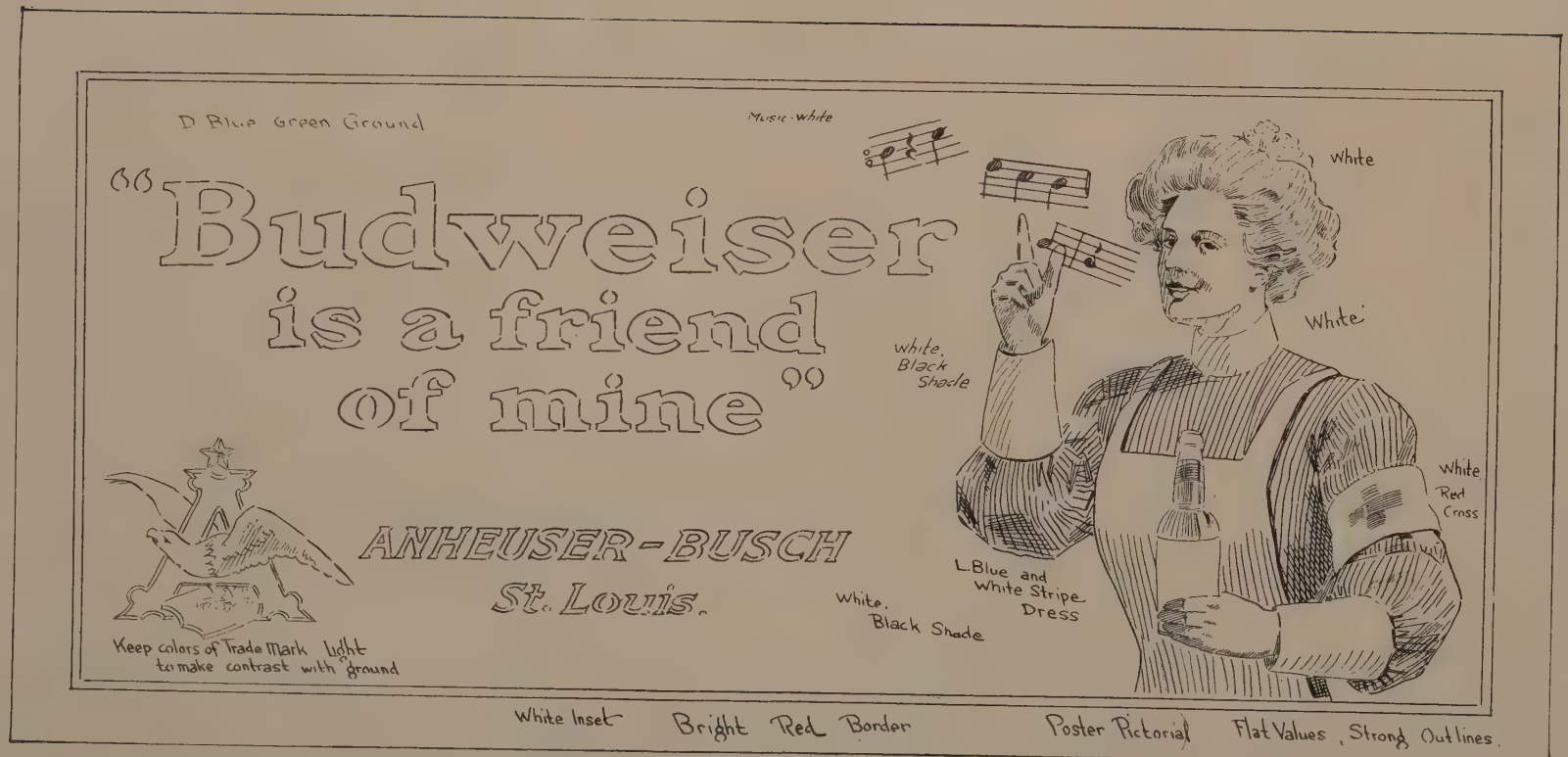


Figure 78.—Pencil Sketch for Bulletin 12′x 25′, drawn ¾ in. to the foot. This is the Usual Kind of Sketch Supplied in All Studios.

Figure 79.—Pictorial Change in a Serial Campaign.

Figure 80.—Pictorial Change in a Serial Campaign.

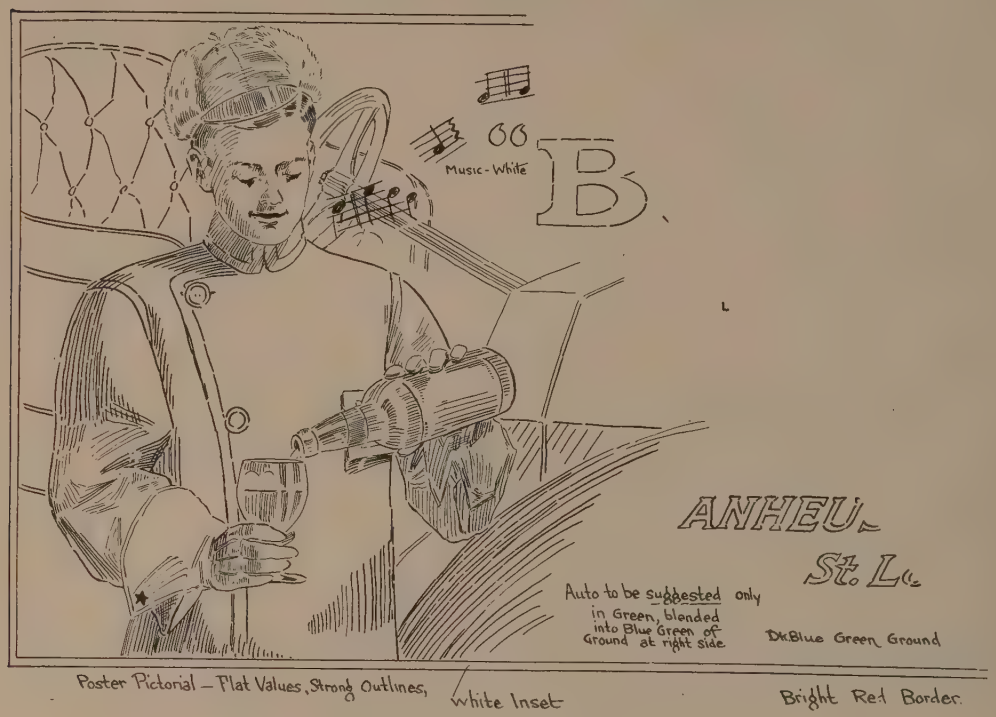

Music-White
B
ANHEU
St. L
Auto to be suggested only in Green, blended into Blue Green of Ground at right side
Dk Blue Green Ground
Poster Pictorial – Flat Values, Strong Outlines,
White Inset
Bright Red Border

Figure 81.—Pictorial Change in a Serial Campaign.

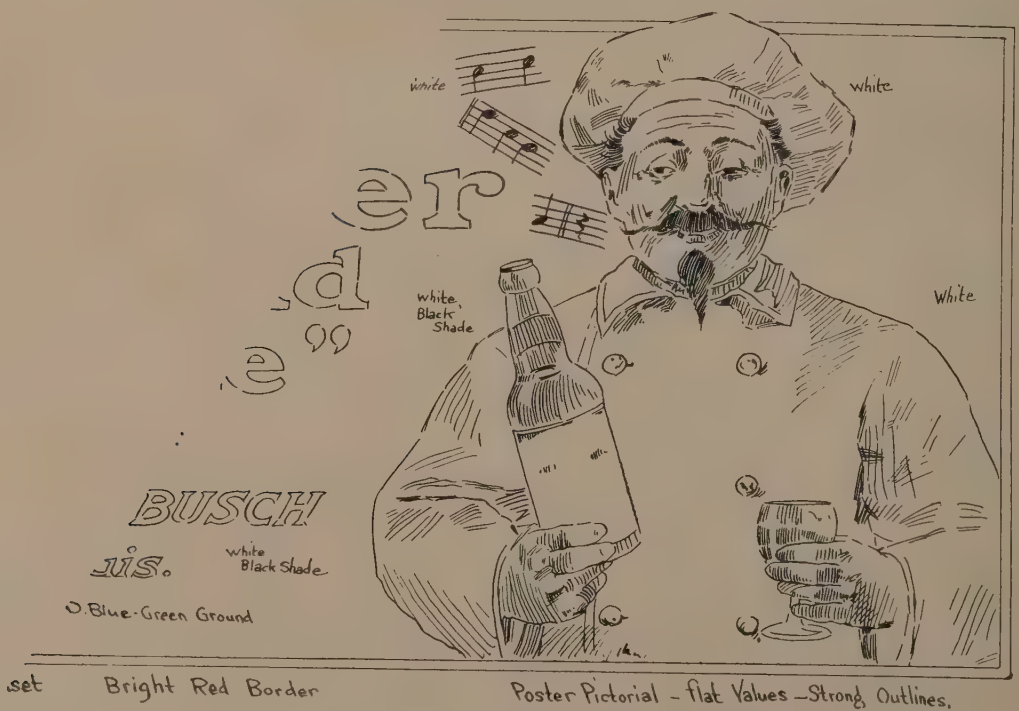


Figure 82.—Pictorial Change in a Serial Campaign.

Figure 83.—Pictorial Change in a Serial Campaign.

INDEX

PAGE

Academy boards..... 24
Advertising, connective..... 210
Advertising drops..... 202
Advertising, outdoor painted display 207
Advertising, wall..... 233
After pouncing 223
Anatomy, artistic..... 70
Architectural painting..... 170
Arms and hands painting..... 58
Artistic anatomy..... 70
Art reference..... 167
Automatic brush..... 236
"Auxiliary" line..... 97

Background and accessory dead coloring 50
Backgrounds 42
Badger blenders..... 23
Beginners, common faults of..... 48
Binding medium, the..... 154
Bird's-eye views..... 91
Blue group of colors..... 20
Boomerang, the..... 151
Border, elliptical arch..... 179
Borders 215
Borders, drawing of..... 176
Bow snap line, the..... 156
Breadth 26
Breast painting..... 57
Bridge, the..... 150
Brush, automatic 236
Brushes 153
Brushes and implements..... 227
Brushes, cleaning..... 34
Brush pot..... 227
Brush washer..... 23
Bulletin art..... 207
Bulletin kit..... 226
Bulletin palette.....225, 226
Bulletin studio..... 221
Bulletin, surface of the..... 228

Canvas 23
Canvas, preparing the..... 155
Capstan 148
Cat-o'-nine, or flogger..... 152
Center of tower or turret—how to find it quickly..... 176
Clouds 31
Clouds, light..... 31
Cold colors..... 231
Color combinations..... 230

PAGE

Color, general hints on..... 30
Coloring, thin..... 169
Color list..... 16
Colors 13, 154
Colors, cold..... 231
Colors, compounds of three primary 15
Colors for skies..... 30
Colors in use by modern artists.. 15
Colors, normal red..... 15
Colors, primary..... 14
Colors, secondary..... 14
Colors, tertiary..... 15
Colors, warm..... 231
Color tray..... 226
Composition 211
Composition in lettering..... 213
Composition, pictorial..... 71
Compounds of three primary colors 15
Connective advertising..... 210
Contrasts, strong..... 231
Curtains, drop..... 202
Curtains, rolling and hanging.... 164
Cutting in..... 232

Dead coloring..... 44
Designing 210
Designing, general..... 231
Diagonals, division of lines by... 86
Diagonals, method of..... 100
Direction and magnitude of perspective lines, exact determination of..... 106
Direct projection, method of..... 116
Displays 218
Distances 32
Distances, middle..... 32
Division of lines..... 93
Division of lines by diagonals.... 86
Division of lines by the method of triangles 99
Division of work..... 49
Doubling 95
Dragging 168
Drapery 60
Drapery study, preliminary..... 198
Drawing and arrangement of set scenes 184
Drawing from nature..... 67
"Drawing-in" on the stretch..... 156
Drawing of borders..... 176
Drop curtains..... 202

PAGE

Drops, advertising 202
Drops, olio 204
Drying the first painting 50

Easel 23
Ellipse, rule for determining focal points of an 233
Elliptical arch border 179
Eyes, painting 56

Fairy scenes 191
Faults of beginners, common 48
Figure, ideal man's 70
Figure, ideal woman's 71
Fireproofing 200
First painting 23, 43
Flesh tints, bright 37
Flower studies 35
Foliage 33
Foregrounds 34
Frames 147
Fugitive color 16

Galvanized iron painting 222
Galvanized iron palette 226
General equipment 147
General recapitulation 217
Glazing 25, 169
Glossary 62
Gradations, comment on 46
Gradations, lights and darks 27
Gradation, to render a 166
Grommets 200
Ground line 114

Hair painting 41
Halving 93
Handling 26
Heads, painting 35
Horizon 75
Horizontal line 181
Horizontal lines, direction of 108
Horizontal lines, length of 115

Impasting or impasto 26
Implements and materials 22, 227
Importance of good drawing 228
Inclined line 104
Inclined lines, direction of 109
Inclined lines, to find true inclination of 111
Inclined plane 104
Interior lights and shadows 183
Interiors 181
Isosceles triangle 115

"Juice" 12

Key 11, 12
Kit, bulletin 226

PAGE

Landscape painting 27
Landscapes and accessory backgrounds 230
Laying-in 162
Length of horizontal lines inclined to the picture by scale 115
Length of lines parallel to picture 111
Letter faces 214
Lettering, composition in 213
Lettering, styles in 214
Lettering, surface 232
Lights and shadows, interior 183
Line, "auxiliary" 97
Line, ground 114
Line, horizontal 181
Line, inclined 104
Line of horizontal measures 114
Line of measures 102
Line of proportional measures 115
Line of vertical measures 114
Line, optical 74
Lines and their vanishing points 82
Lines, division of 93
Lines, division of, by diagonals 86
Lines, division of, by triangles 99
Lines, finding the vanishing point of a system of 83
Lines, horizontal, direction of 108
Lines, horizontal, length of 115
Lines, inclined, direction of 109
Lines, inclined, to find true inclination of 111
Lines inclined to the picture 79
Lines in the plane of measures 113
Lines, length of, parallel to picture 111
Lines of equal measures 115
Lines parallel to the picture 79
Lines parallel to the picture, parallel to the horizon of the planes they lie in 85
Lines, their direction 82
Lines, their vanishing points 82
Lines, vertical 79
Lithography, influence of 208

Mahlstick 23
Major and minor fifths 217
Making profile 191
Man's figure, ideal 70
Measures, line of 102
Measures, line of proportional 115
Measures, lines of equal 115
Measures, point of 102
Measures, proportional, line of 102
Method of diagonals 100
Method of direct projection 116
Method of triangles 102
Mistakes, to correct 236
Mixing colors, laying-in, and painting 162
Model or sketch 158

	PAGE
Modus operandi	117
Monotone	11
Mural painting	235
Neck painting	57
Neutral group of colors	21
Night scenes	199
Non-poisonous color	16
Oils and varnishes	24
Olio drops	204
Optical line	74
Optical plane	75
Orange mineral, to keep in suspension	236
Ornament	215
Outdoor painted display advertising	207
Painting, architectural	170
Painting galvanized iron to insure durability	222
Painting heads	35
Painting, landscape	27
Painting, mural	235
Painting, procedure in	228
Painting, second, for the head	56
Painting, the first	43
Painting the pictorial	223
Palette	151
Palette, arrangement of flesh tints for	36
Palette, bulletin	225
Palette, bulletin, popular	226
Palette cup	22
Palette, general utility	224
Palette knife	23
Palette, setting	34, 162
Palettes (galvanized iron)	226
Palette, systematic and detailed arrangement of tints for	42
Palette, the second	51
Panels	215
Parallel lines, systems of	74
Parallel planes, systems of	75
Permanent color	16
Perspective	72, 77, 86, 99, 106
Perspective, phenomena of	73
Perspective plan	86, 90
Perspective plan, advantages of	116
Perspectives, axis	77
Perspectives, center	77
Perspective, sketching in	86
Perspective, stage	175
Perspectives, station point	77
Perspective, three principal rules of	76
Phenomena of perspective	73
Phenomena relating to the picture	77
Pictorial composition	71
Pictorial, painting the	223
Plane, inclined	104
Plane of measures	111
Plane of measures, lines in	113
Plane of picture the plane of measures	114
Plane of the picture	77
Plane, optical	75
Planes, their direction	82
Planes, their vanishing horizon	83
Planes, to find horizon of a system of	83
Point and line of proportional measures	102
Point of measures	102
Points of distance	110
Poisonous color	16
Porte-crayon	152
Poster and displays, modern	218
Pounce pattern hangers	234
Pounce patterns	223
Pounces	196
Preliminary drapery study	198
Primary colors	14
Primary neutrals	11
Procedure in painting	228
Profile cuts on netting	193
Profile, making	191
Proportional division	96
Proportional measures, line of	102
Purchase wheel	148
Purple group of colors	21
Quartering	93
Raw oil, advantage of	229
Red group of colors	16
Reference material	220
Reflections	47
Reflexes without white	54
Rinsing cup	23
Rinsing pot	227
Rolling and hanging curtains	164
Rule for determining focal points of an ellipse	233
Scale drawing	159
Scale of the drawing	113
Scene painting	183
Scene painting, possibilities of	200
Scenic colors, general hints on	165
Scumbling	26, 168
Secondary colors	14
Second painting	29, 163
Second painting for the head	56
Second palette	51
Sectional set pieces	199
Sections parallel to the picture	104
Sections taken parallel to the picture	85

	PAGE
Set pieces, sectional	199
Set scenes, drawing and arrangement of	184
Setting the palette	34, 162
Shadows, interior	183
Shadows, real	54
Shoulders painting	57
Size an important factor	209
Sketches, more about	234
Sketching	89
Sketch room	158
Skies, clear evening	31
Sky line	32
Space, large, is imperative	227
Stage perspective	175
Stained glass windows	199
Stenciling	198
Stencil patterns	197
Stencils	197
Straight-edges	152
Strong contrasts	231
Studies	34
Studio, building a	145
Studio, bulletin	221
Studio, the	145
Styles in lettering	214
Subjects and composition	211
Sunlight	27
Surface lettering	232
Surface of the bulletin	228
Symmetrical division	96
Systems of parallel lines	74
Systems of parallel planes	75
Tapestry	199
Tertiary colors	15
Theatrical scene painting in distemper	145
Thin coloring	169
Third painting	29, 163
Tone and key	11
Tower or turret, how to find center of	176
Transformation and fairy scenes	191
Transparencies	194
Trees	32
Triangle, isosceles	115
Triangles, division of lines by	99
Tri-color neutral	230
Tripling	95
Tyro versus artist	212
Uniformity	216
Values	11
Vanishing line	75
Vanishing points	74
Vanishing points of lines	82
Vanishing point of system of lines, finding	83
Varnishes	24
Vertical lines	79
Wall advertising	233
Warm colors	231
Woman's figure, ideal	71
Yellow group of colors	18

YOUR NEXT BRUSHES

"Perfect Stroke"

YOU Fellows who have tried "this, that, and the other brush" and have failed to get 100 per cent satisfaction, here's "the surest thing you know."

Tria "Perfect Stroke" and your brush troubles will be over

"Perfect Stroke"

¶ The "Perfect Stroke" has no equal for clean lines, accuracy, dependability and all-round classiness.

¶ The material and workmanship are "away above everything" and I guarantee that every brush will make good.

So don't hesitate—no need to be a skeptic, but **WRITE RIGHT Now** for **Free** catalog to

BERT L. DAILY

24 N. Jefferson St.

DAYTON, OHIO

SIGN AND SCENIC PAINTING

Attractive Work Means Increased Business—STOP WASTING YOUR TIME

DO 3 JOBS TO ONE "THE NEW WAY" USE ↘

PAASCHE PNEUMATIC BRUSHES!

SCENIC ARTISTS AND INTERIOR DECORATORS have used Paasche air brushes for years and heartily endorse them for reason of efficiency, speed and far superior effect produced over old hand brush methods. This Quick Action Tool puts the color used in desired amount where wanted, and in a more effective way than is possible to do the old way. Produce from a line to any size spray with a simple pull of a trigger.

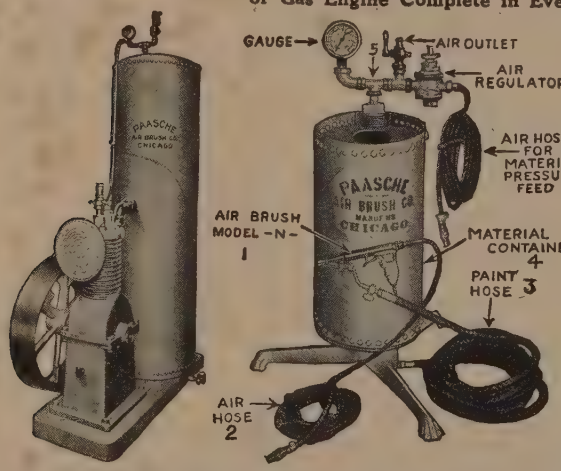
Acknowledged without an equal for applying Water, Oil, Distemper, and Japan Colors—as well as Varnishes, Shellacs, Bronzes and other liquid materials.

You cannot afford to do without THE BEST. Meet competition with MODERN methods. Leaves your work free from brush marks—absolutely smooth and even.

ONE OF OUR MANY POPULAR MODELS

For Bulletins, Decorating and Finishing!

Paasche's Portable Painting Outfit with No. 32 Air Compressor Ready to Attach to Motor or Gas Engine Complete in Every Detail



Enables you to cover in one coat equal to two or three coats by hand, no matter whether metal, wood, cement or wall surfaces of every description.

For Bulletin Board Painting, Large Metallic Signs, Painting or Finishing from Boats to Battleships, Bridges, Cars and Tanks, etc.

CAPACITY 30 SQUARE FEET PER MINUTE

These outfits will pay big returns on the investment, also save time and labor and guaranteed to produce far superior finishes.

"Beat Competition Before It Beats You." We will prove more than we claim.

Large or Small Outfits for Your Special Requirements. Be Progressive

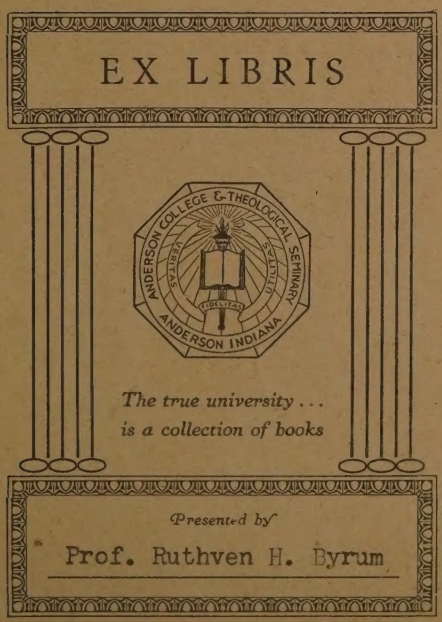
LET US QUOTE YOU ON ELECTRIC OR GASOLINE EQUIPMENT

Paasche Air Brush Co.

Manufacturers 999 MADISON TERMINAL BUILDING CHICAGO

ANDERSON COLLEGE
LIBRARY
ANDERSON, INDIANA

ANDERSON COLLEGE
LIBRARY
ANDERSON, INDIANA



P7-BSE-863